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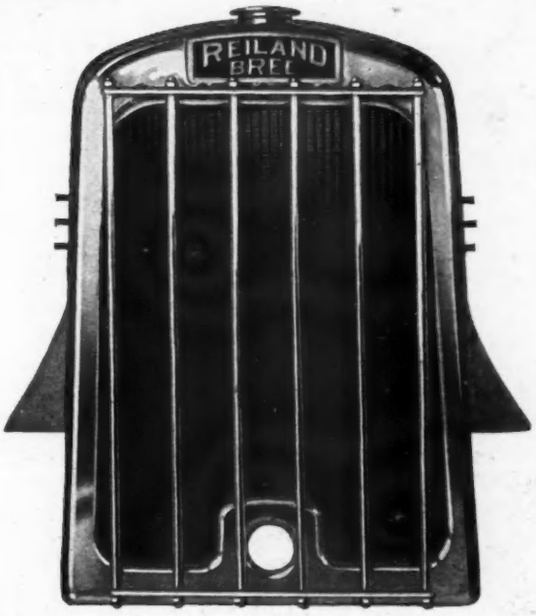
Appearance



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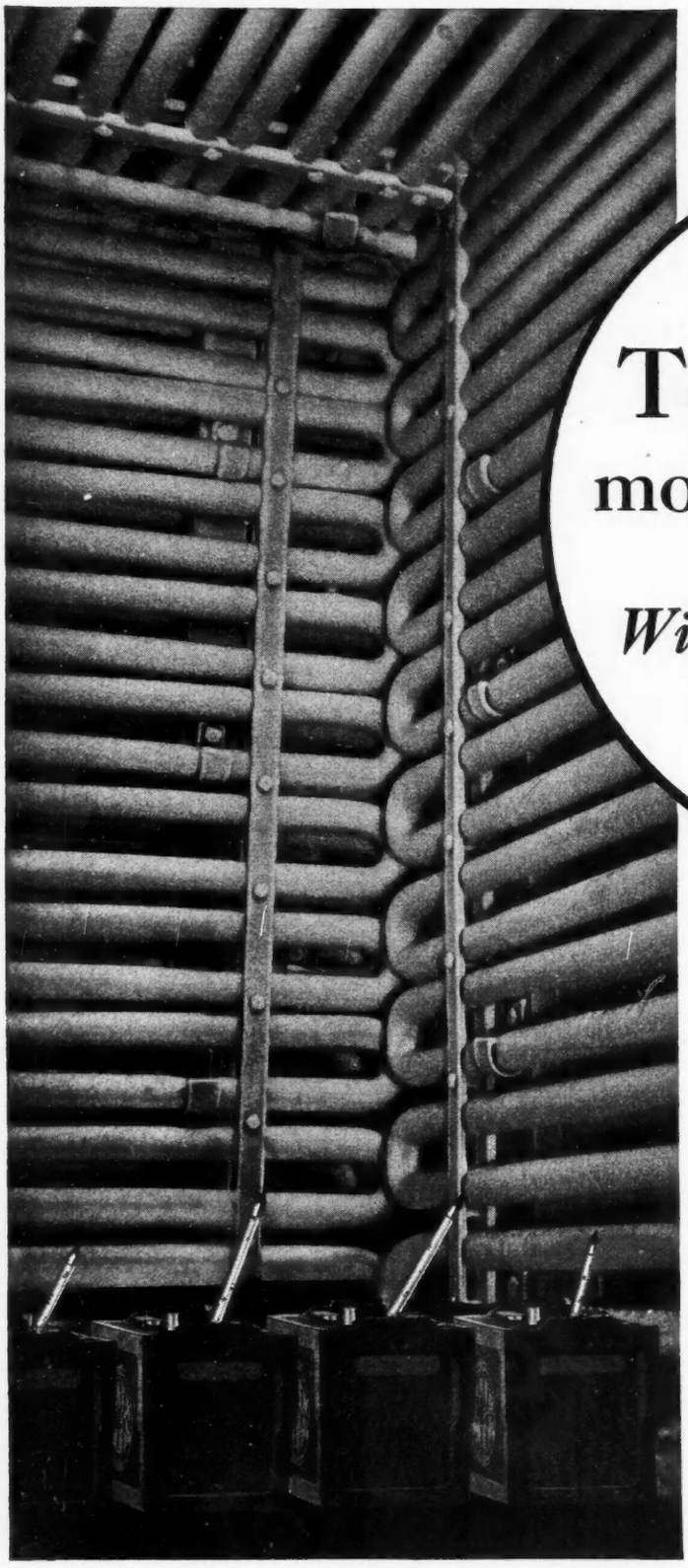

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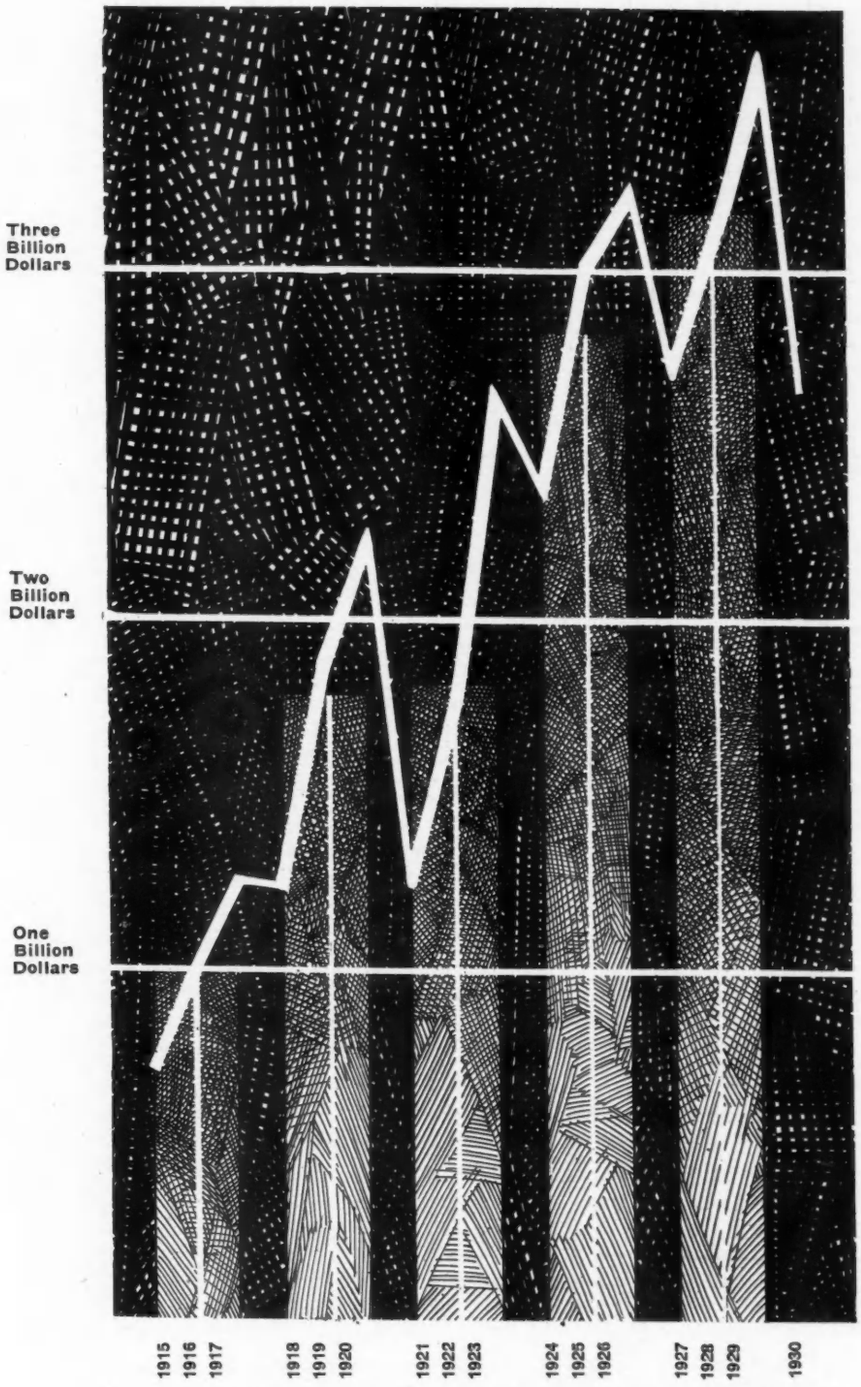


Motor Vehicle Production in Wholesale Dollar Value by Years

Automobile Business Trend Parallels General Conditions

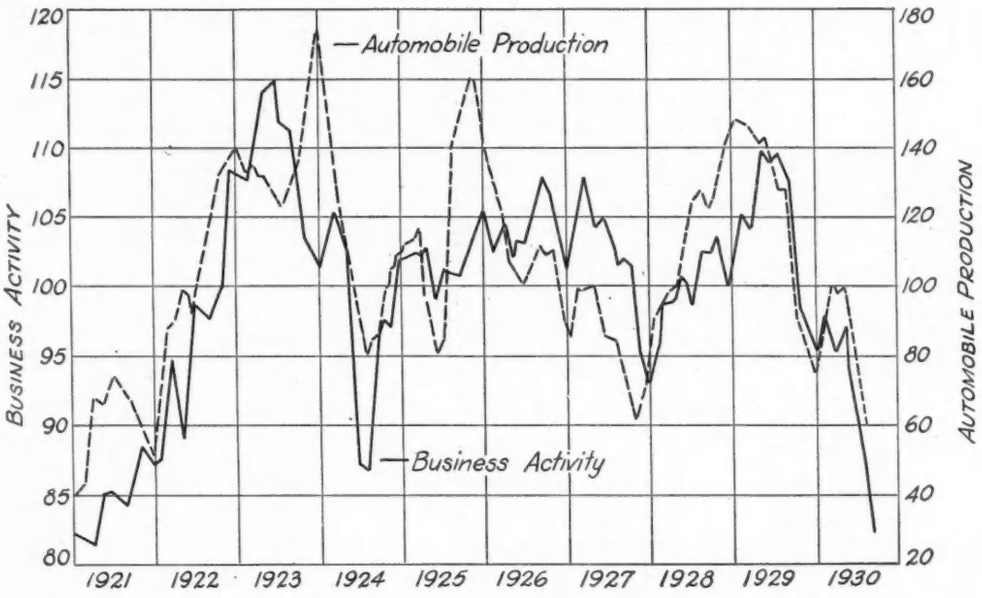
By Leslie Peat

BECAUSE it is entering its period of stability, the automotive industry has behaved in recent years in a manner similar to older industries. Motor vehicle production has approximately paralleled the curve of general business activity; wholesale value of motor vehicles produced shows even a closer fit to the trends of general business activity.

That 1930 has been an off year in this industry seems to prove the point that we may expect automobile business to parallel general business condition trends in the future.

The curve of general commercial and industrial activity since the days of the Civil War shows a definite, traceable series of business cycles. These in turn are composed of periods of depressions, recoveries and prosperities.

There are several ways of expressing the length of these cycles. The three-year or 40-month cycle is, generally speaking, a breakdown of the more clearly pronounced seven-year cycle. The three-year curve simply



Here are plotted the Business Activity and Automotive Production curves for the period of 1921 to date. The two curves have been plotted on different scales to show that Automotive Production follows directly the trend of General Business Activity

traces in more detail the peaks and valleys of the longer cycle. That there have been seven good years, in the aggregate, in every decade is another way to say that there have been three cycles of depression, recovery and prosperity in every 10 years.

Comparing one year's business activity with that of the preceding or following year—regardless of where those years were in relation to the beginning or end of clearly-defined cycles—is a delusion under which many businesses have been laboring for too long a time.

An average of three years' performance would be by far a better measure by which to evaluate any one year's performance, because as the above chart shows, no one year has much in common with its neighboring year as to performance.

The chart further shows that, because of the sudden turns in the curves, single, isolated years perform too erratically to form the basis of any worth while comparison.

If this present slump has taught business anything, then, we may expect it to be that business cycles are things to be reckoned with. Excessive expansion means that an excessive toll of business depression must be expected as the complement of the business cycle.

So, while we are experiencing today definite signs of recovery, we might look back on the long-time trend of business activity and project these trends out into the future for the purpose of forecasting something of the outlook in the automotive field.

Because of the specific problems in any one industry, such as the developing of new channels of distribution and new services offered, forecasting an industry's future, in terms of months or quarters, is at best a dangerous procedure.

But if we agree that the automotive industry has become an integral part of the industrial order of the world, we may well deduce that its fortunes and setbacks will be in general analogous to those of general business.

Probably the loss of perspective by not observing the behavior of general business conditions, has made for a larger amount of hysteria than any other single factor of the present depression. Certainly the large financial interests which took advantage of the low levels of common stocks by buying heavily during the present depression, must have been guided by the histories of other slumps and other factual data readily available.

A year and more ago, every favorable item of business news was exaggerated for the consumption of eager speculators. Emphasis of these favorable indications, together with the minimizing of reports of overproduction, surplus capitalization and excessive expansion programs, led all and sundry to the conclusion that there was no end to prosperity.

A look at the long-time trend of business would have shown that a tumble was due, just as a look at this time of the same curve will show that we may expect a steady rise of general business conditions in the near future. Rumors of failures and financial difficulties have been widespread and insistent. That these predictions of dire distress have not entirely come true, that business is actually showing some signs of recovering means nothing to Dame Rumor.

Certainly the present slump is nothing to underrate. It has been genuine. But in the throes of this depression we have seen a much unwarranted hysteria. Between the extremes of pessimistic fatalism and Pollyanna optimism, there lies a great valley of facts which today are shaping the destinies of business.

Now, for some of these facts:

1. All the composite indexes of general business conditions show that industries have reached cyclical (i. e., after allowing for long-time trend and seasonal variation) levels below those of 1921.

2. Although unemployment is cyclically below the 1921 level, payrolls are higher than they were during that depression.

3. Gross earnings of a representative group of industrials are much larger this year than they were in 1921, even considering normal increases.

4. Fewer failures have been reported this slump than during the 1921 depression.

These facts would indicate that now, since the bottom has apparently been reached, and that since there is

a comparatively strong purchasing power, we may expect an upturn something similar to that following the 1921 slump. It cannot be measured in terms of months, and its curve may not accurately be fitted to any previous recovery, but the recovery looks secure.

Now, business in general has seen the results of the late spree. Unproductive overhead has been drastically reduced by great corporations and small concerns alike. And out of it there will come new merchandising strength, some reduction in productive capacity and sounder business policies in general. As these factors play their part, business revival will be accelerated; they are the life of progressive commerce, and their very appearance augurs well for a strong comeback in general business conditions.

If over-productivity could be measured with any degree of accuracy, it would be interesting to see just how large a part this factor has played in the business slumps of this century. But we must be content with knowing that during the two years of recovery and prosperity of the three-year business cycle, over-expansion has always run to excess.

It is hard to imagine any business or any industry that would not take advantage of easy sales, ample flow of money and ready participation in common stocks and bonds on the part of an enthusiastic public. These all are just what business wants and full advantage will be taken by industry of these conditions.

But when the general business curve begins to drop again after this three-year period, business will again be faced with the problem of quickly reducing production as a measure to avoid the calamities of overproduction. But the present distress will be so ameliorated by the recovery during the next two years that it will be hard for industry to get down to facts without some herculean effort.

It may be slower in its consummation. As a matter of fact, never before in the past 50 years has the bond market advanced so far as it has during the past 14 months without a pronounced upturn in the stock market.

The present bear market in securities may turn out to be one of the longest on record. Perhaps not until the first of the year will there be any great improvement in prices and volume of trading. But a study of the past performances of market transaction curves clearly indicate that rises have always been sudden following the period in which depressions have run their course.

It is generally agreed that the bottom strata has been reached. Scores of stocks can be bought at prices that are about equal per share to the cash position of the company.

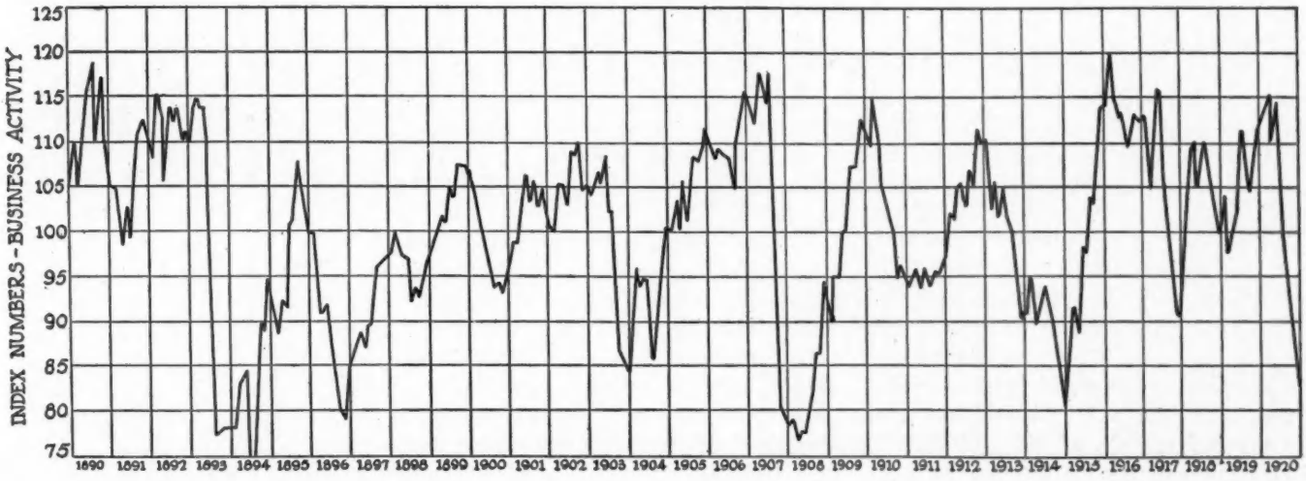
Commodities are at extremely low levels. Industry generally is free from a tremendous non-productive overhead charge as a result of many drastic departmental and personnel reductions. The public's present "buying strike" has resulted in the accumulation of a tremendous surplus of savings.

The stage is set for a changed mental attitude on the part of the public, to bring back a wave of prosperity perhaps greater than we have ever experienced, war times excepted. A year of depression is behind us, bringing us twelve months closer to the upturn than we were when the recent stock market crash again proved the dependability of cyclical trends.

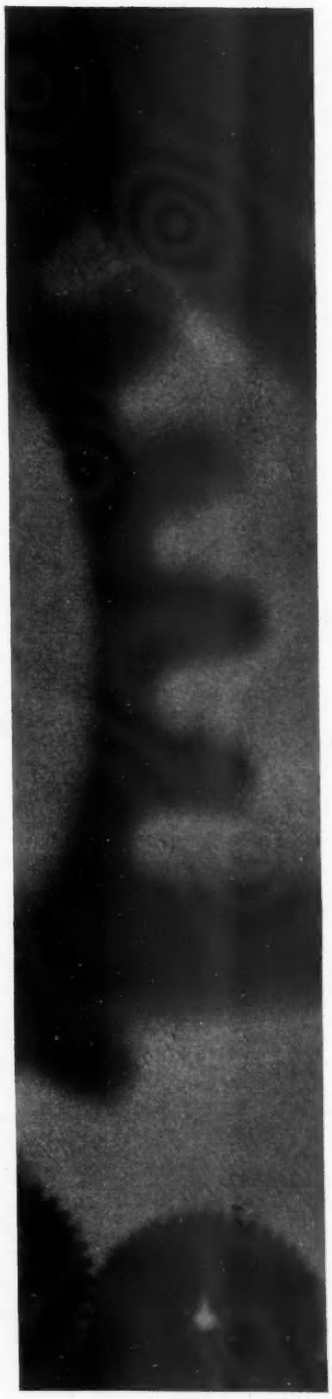
History has indicated the futility of any human effort in changing the course of general business. The key to this control has not been discovered. But the mass will follow venturesome individuals who begin to turn the tide in public sentiment.

Time will again mitigate the shock of the present calamity. Thousands who had little previous experience in disasters will venture into the new market and in venturing will establish new commercial and industrial enterprises and make new fortunes. The curves of past performance indicate a revival during the first and second quarters of next year.

General business follows cycles of seven years with almost mathematical accuracy. Note on the chart below that the "lows" are in the years 1894, 1900, 1907, 1914 and 1921. With the exception of 1900, the "low" of which came within two months of being in 1901, the trend has followed in seven-year cycles and each of these cycles has been divided by lesser cycles varying from 36 to 40 months + + + + + + + +



Slide-rule is Scepter in



Financial superiors will back the engineer now, sales departments will welcome his ideas and production associates will aid him as never before

CERTAINLY the one division of the motor car industry that has no cause for deploring the times is the engineering department.

It can do more than any other single department to correct the economic evils that exist. Business distress has brought engineering opportunity.

In fast-moving, prosperous times when profits roll in, the executive and financial departments of the average automotive concern are all too prone to sit tight and let well enough alone—to hold back on chance-taking innovations, to restrict expenditures for development and experimental work.

But in times like these—when every resource of mental endeavor is expended to create markets, when the satiated purchasing appetite of the consumer is only to be tempted by new and new things—then the real constructive creative engineer comes into his own.

To the automotive engineer who has a breadth of view, a passion for continuous development, and an emotional as well as a mental appreciation of car owners' desires; to the engineer who has kept contact with the pulse of the public demand, the gateway of the future swings open wider than ever in the past.

His financial superiors will back him freely; his sales department will welcome his new ideas without calling them freaks; his production associates will give him aid and assistance as never before. On all sides his efforts will be supported and sustained as they never will and never can be in easy times.

What engineer, worthy of the name, but has dreamed of achievements—visioned goals too far distant to be in the ken of today?

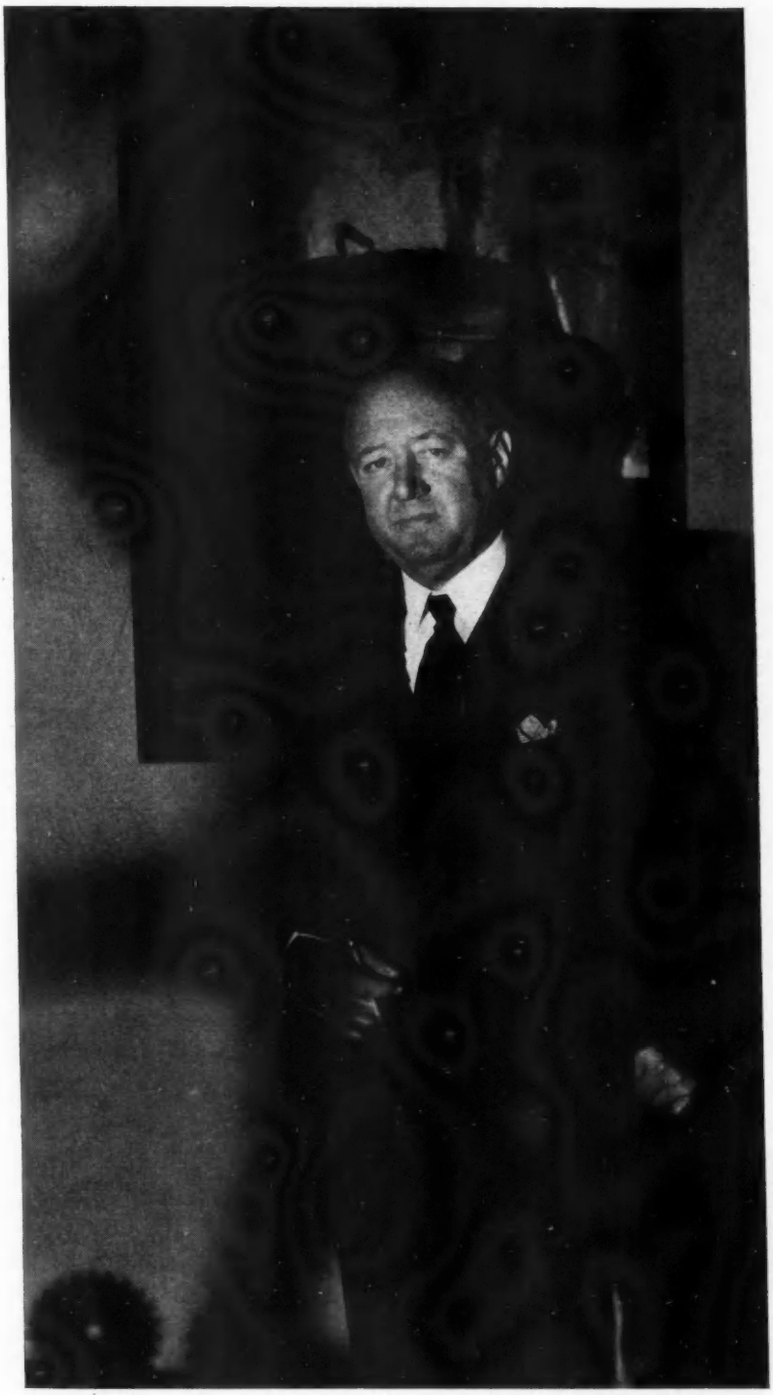
Where is the engineer who has not had ideas and fancies which he hardly dared admit to himself because of their far-reaching and far-appearing results?

"Lives there an engineer with mind so dead" that he has not filed in the recesses of his brain some incoherent thought, some indefinite idea which he has put aside as a freak, or too risky, a visitor too radical ever to be introduced into the Tory society of average engineering thought, a fancy too advanced even to talk about? Yet the freak of today is the conservative thing of tomorrow.

And in all the history of the automotive industry there never was a time when the formerly conservative financial heads of institutions would listen to freak ideas more eagerly than today; and never was there a greater demand for new things, for new ideas, than today.

My own experience proves this latter statement conclusively. Probably I have developed a reputation as leaning toward the "freakish" in my viewpoint; perhaps because I was instrumental in the original introduction into stock passenger cars of some new thoughts. But would you today call

Industry Today—Says Fredrick E. Moskovics



"Business distress has brought engineering opportunity," says Mr. Moskovics in this startling arrangement of automotive technical lethargy and executive conservatism in mechanical matters.

"No longer is there any doubt about the chance for the engineer," he states; "from here in it's a question of the engineer's ability to measure up to his chances."

Here is a frank, vigorous, thought-provoking article by one of the most colorful, best-known and most talked-about engineer-executive personalities ever associated with the automotive industry. You may not like some of the things he says, but you'll find men all over the industry talking about these ideas he expresses. Better read it NOW!

safety glass new or freakish? Worm drive? Low center of mass? The backstop? Yet, every one of those once were called freaks by certain automotive executives.

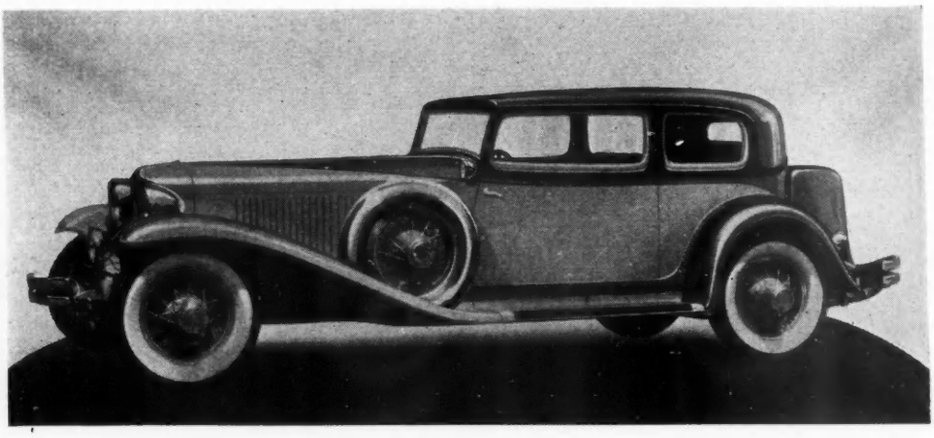
But times change. Several of these very executives—heads of great automotive organizations who only a few years ago called these ideas freaks—have called upon me to suggest to them lines of future development in automobile design. One wouldn't be human were he to fail to take some pride in that fact or get from it a certain thrill of satisfaction.

These executives have sought advice because they wanted to be in a position to make suggestions to their own engineering departments as to future improvements. Their engineering departments, they say, are in a rut. They want to stir their technicians out of that rut. They desire to enact the role of leader. These very executives, of course, fail to realize that in most instances, they themselves created the

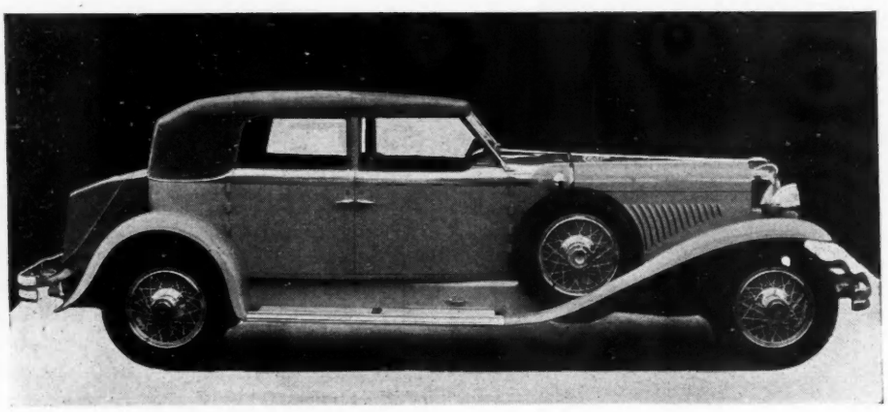
(Continued on page 696)

AERODYNAMICS IS THEME OF

Smaller wheels and larger hubs make many new models appear lower



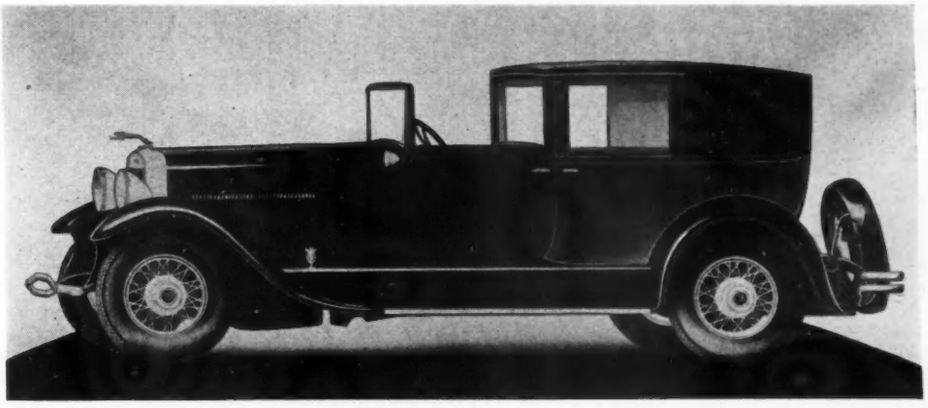
A Victoria Coupe designed by Le Grand is being shown on a front-drive Cord chassis. It will accommodate four or five passengers. Wheels and cowl saddle molding are chrome + + + +



The Convertible Berline shown here was built by Murphy and is being displayed on a Duesenberg chassis. The body has been developed with a "straight-across" division glass which disappears entirely when down

AUTOMOBILE owners interested in the finer types of motor cars are anticipating the forthcoming debut of the new styles and fashions in custom coachwork and the latest improvements in chassis design. This presentation is at the twenty-sixth annual Automobile Salon in Chicago for one week beginning today, in New York

TREND AT THE CHICAGO CUSTOM SALON

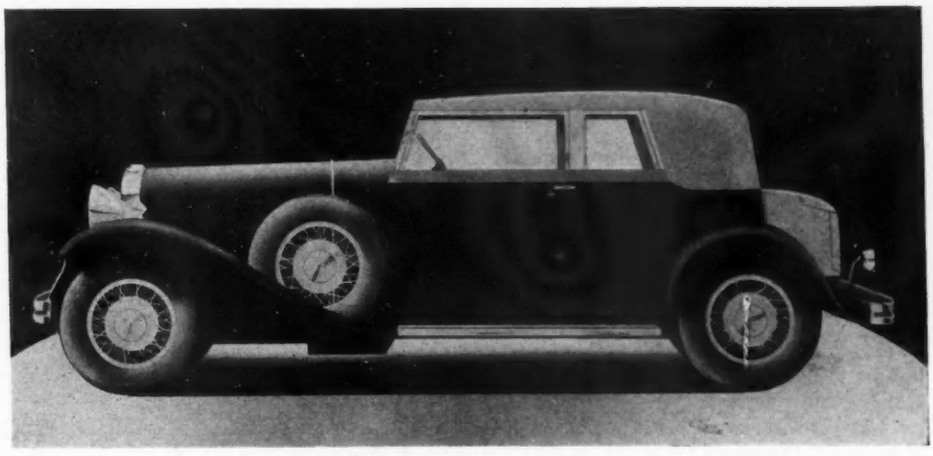


This body type, the Panel Brougham, as developed by Willoughby, is an interpretation of the French town car for a Lincoln chassis. It accommodates two or four passengers besides the chauffeur, whose compartment can be entirely closed + +

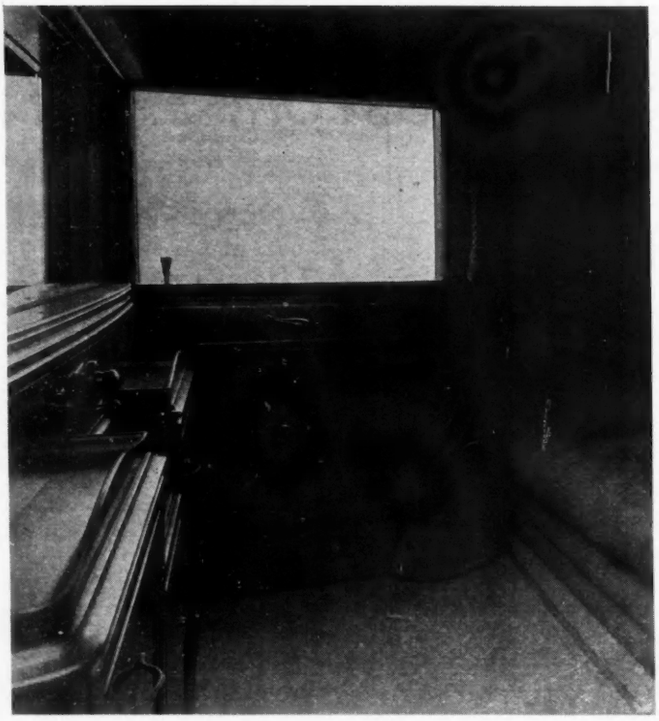
A four-passenger Club Sedan made by Dietrich for a Packard chassis is being shown. Both doors on this attractive model swing from a door pillar on a line with the rear of the driver's seat + +

the first week in December, and repeated in February at Los Angeles and San Francisco.

These exhibitions are the source from which come the body-building styles copied to some extent in the less expensive standard automobiles of large production.



A Sportsman's Coupe on Marmon chassis is being shown by Locke & Co. The body is of the two-door type, but the doors are very wide. It accommodates five passengers

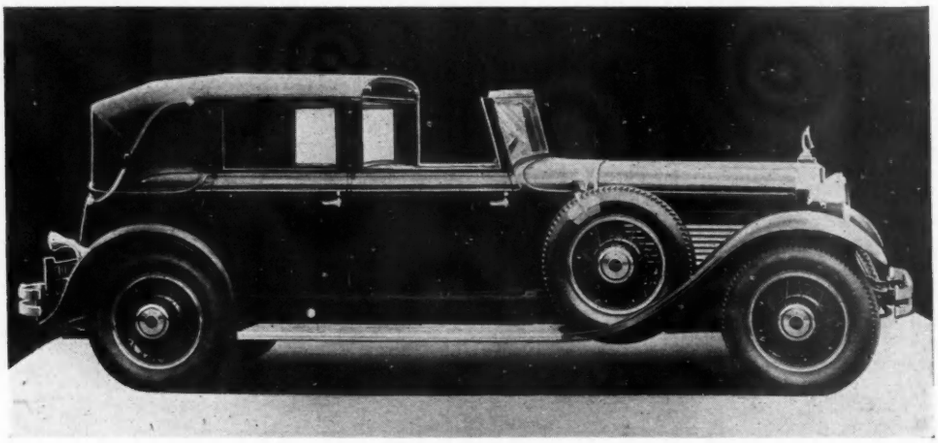


Above is shown the interior of the Trouville model at the Rolls-Royce display. The upholstering has been done in reddish beige broadcloth + +

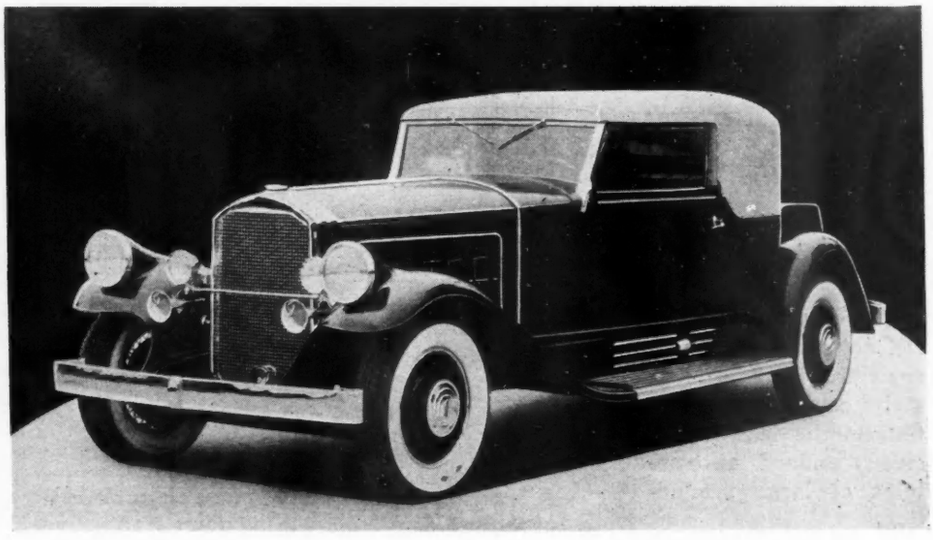
The Salon this season will disclose several marked tendencies in the field of the custom coachmaker. In a general way, there are really two schools, one which adheres rather closely to precedent and established practices, always seeking, of course, further refinements along these lines. The other school strikes boldly out for itself and discards accepted standards.

The new school is finding inspiration in aerodynamics and is adopting the lines of the aeroplane fusilage. In these, of course, the principal aim is to reduce wind resistance and this is becoming an important factor due to the increased power and speed of the modern fine motor car.

While rich beauty and general luxuriousness continue to be important aims of the custom coachmaker, a real effort is apparent to increase both comfort and convenience. The new models presented at the Salon are generally lower,



The Stutz Convertible Cabriolet is the work of Brunn. With the extension roof in place over the driver, it is a perfect enclosed-drive limousine. The rear quarter collapses, giving a Landaulet effect



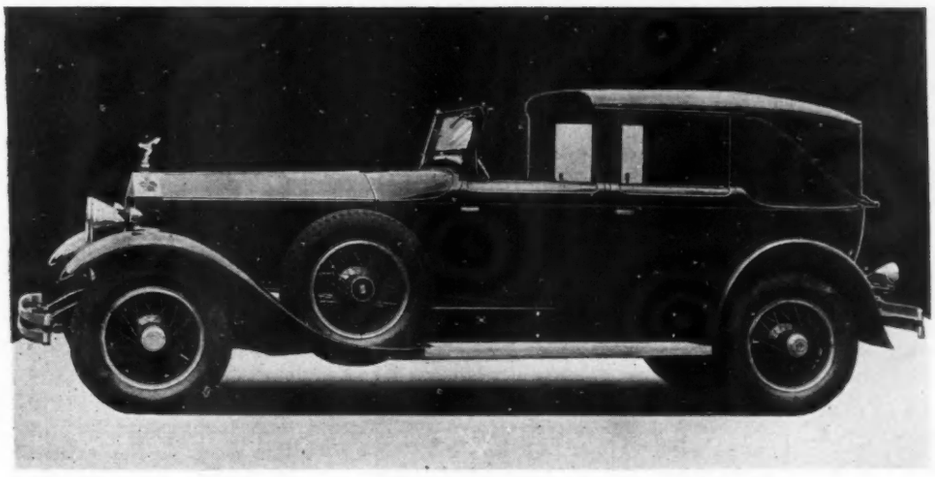
Pierce-Arrow is showing a LeBaron five - passenger Convertible Victoria on its 144-in. wheelbase. It is designed to meet all the demands of utility and smart open-car freedom

more graceful and suggestive of greater fleetness.

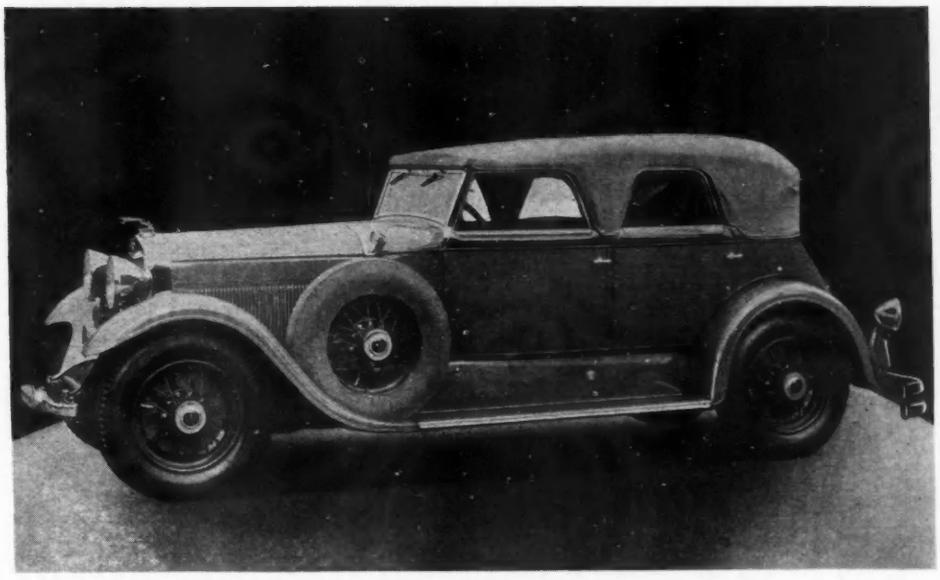
Fuller contours are seen and a softening of outlines, generally achieved by larger curvatures at the corners and a more gentle sweep of molding lines. Smaller wheel diameters and larger hubs help to make the cars appear lower. Radiator screens, introduced last season, have been widely adopted. Wide doors and generous headroom add to the factor of convenience as do the remote controlled type of door handles.

All of the established types of custom bodies are continued. The convertible or all-weather body is at least holding its own and many of the phaetons, coupes and sedans have this feature. The new convertible "jobs", however, show marked refinement in their mechanism with the tops folding easier. Generally, when converted into an open car, the tops fold down and are completely hidden in deep wells within the body.

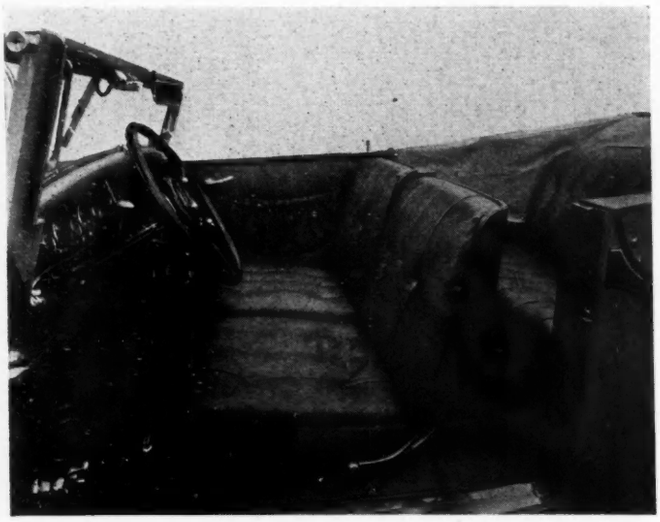
Elaborate interiors are conspicuous at the Salon. The inviting comfort of the Lincoln Panel Brougham is an example



The Trouville, a five-passenger Town Car, at the Rolls-Royce display, has an all-weather front. The hardware is of Damascene French bronze with brown inlay and Karolith knobs + +

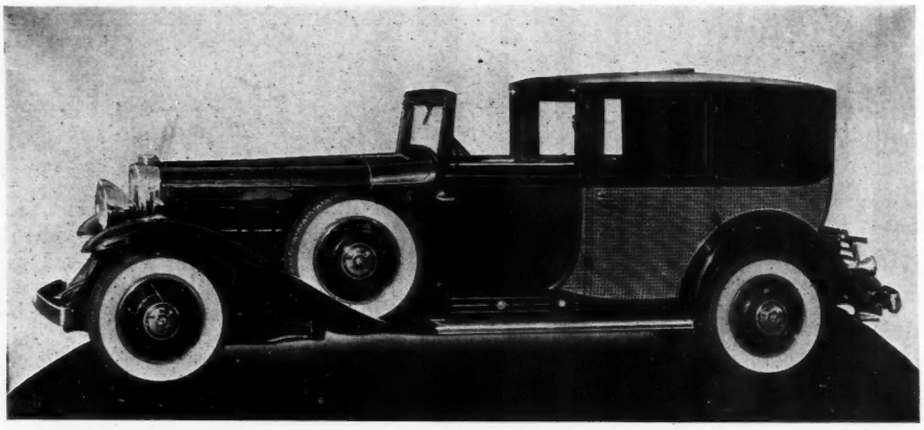


Derham is showing a four-passenger Convertible Phaeton on a Lincoln chassis that is somewhat of an innovation. It has an entirely new deck line curving out somewhat with the effect found in a motor boat + + + +

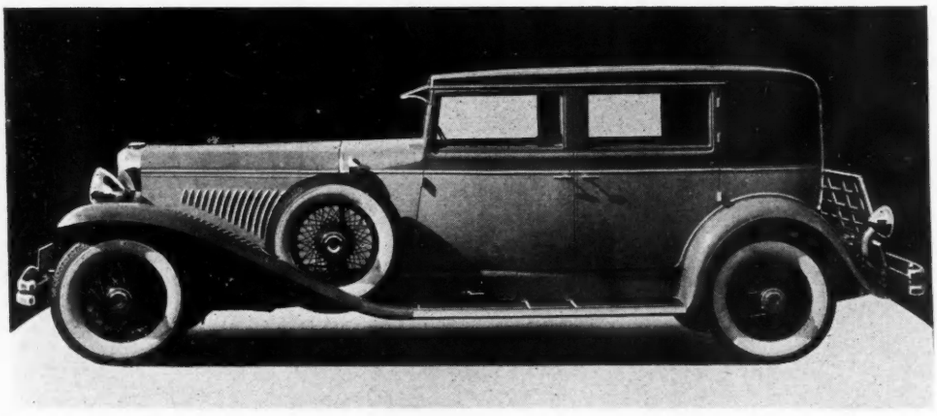


There is a new type of enclosed drive limousine, or berline as this body is sometimes termed. In these, the seating capacity is reduced from seven to six, which makes possible a narrower body at the rear and conformity to the new airplane rear end lines.

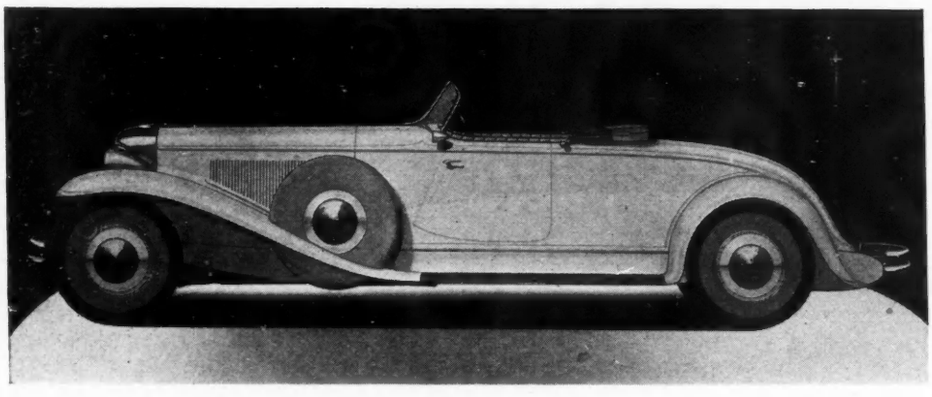
Sport phaetons and other open body types will be found to have increased in popularity, and it is with these jobs that bright and scintillating color effects are being used. From front bumper to tail light these jobs have been greatly improved. Roadsters are giving way to convertible coupes, which have open car



The interior of this Rollston Convertible Victoria on a Duesenberg chassis is trimmed with smooth-grain leather of tan. The unique seating arrangement allows ample room for both access and comfort + + + +



A square-cornered Town Brougham with cane-work on the lower panels is being shown by Fleetwood on a V-16 Cadillac chassis

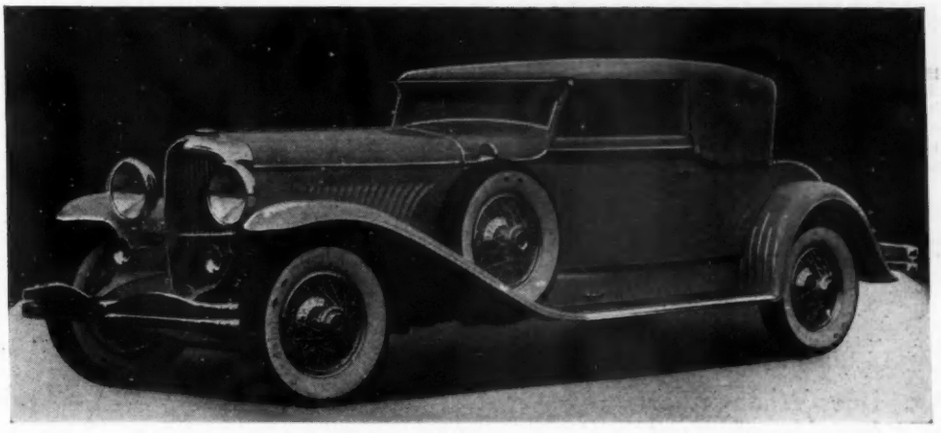


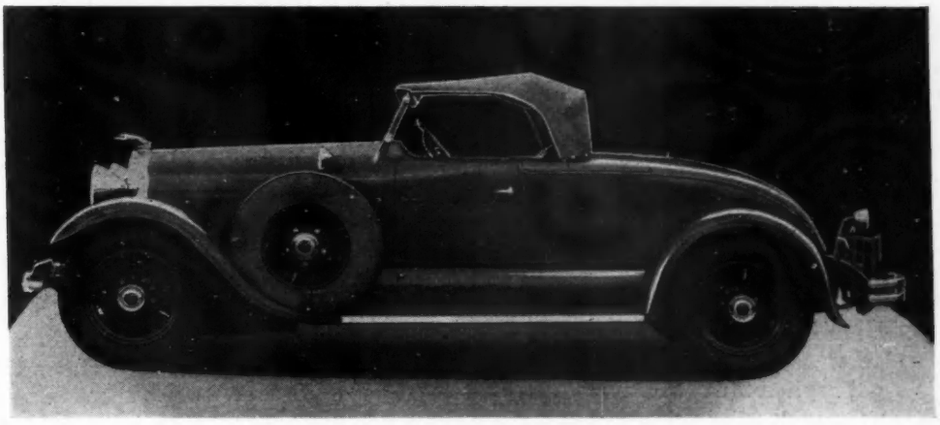
This seven-passenger Berline body is the product of Judkins and is being exhibited on a Duesenberg chassis + + +

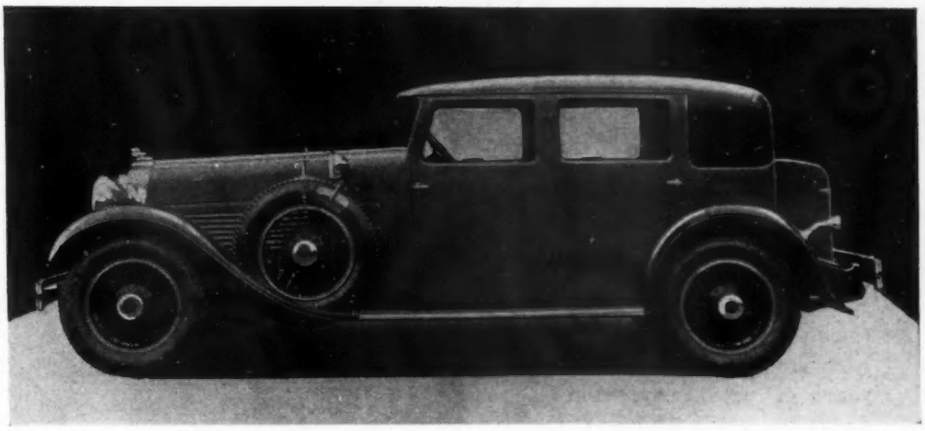
LeBaron is showing a Sport Roadster on a Chrysler Imperial chassis. The top is arranged to fold compactly and set low when down. The cockpit of an airplane was the model followed in this design

utility plus closed car conveniences.

The salon discloses interesting new developments in interior upholstery, decoration and appointments. There is a marked increase in the use of interior, exposed woodwork, especially ornate paneling. This will be found on the lower part of the doors, under rear quarter windows and on the back of front seats. Often, vanity cases, smoking sets, etc., are built into this paneling. For this woodwork, inlaid hardwoods are generally used, especially the mahoganies. Invariably the hardware is utilized for decorative purposes, both in design, material and finish. On the more expensive "jobs", this hardware is bronzed or gold or silver plated, with occasionally colored enamelled inlays. Readily adjustable seats are the rule and seat backs are form-fitting. Both the seats and the backs are deeply padded over resilient springs. Rugs of various materials, including lambskin, beautiful lap robes and pillows are finished to blend with the upholstery. A new feature is cushions with one side covered in broadcloth and the other in goatskin, so that there is always a choice of material.







On a Duesenberg chassis with a long wheelbase is shown a Rollston Convertible Victoria body unusual in design but without a sacrifice of dignity + + + + + +

Locke has designed a Roadster with a top which is entirely concealed back of the driver's seat when down. It is being shown on a Lincoln chassis + + + +

All of the seats in this Weymann body are adjustable for back position and leg room. It is the Stutz "Versailles" Sport Sedan. The fittings and appointments are selected with a care for dignity and beauty + + + + + + + + + +

JUST AMONG OURSELVES

Does Whoopee at the Shows Pay?

LOOKS as though in 1931 there wouldn't be quite as much whoop in the Whoopee which car and truck manufacturers are accustomed to make for their dealers at New York and Chicago Show time. The usual round of dinners and luncheons are going to be held, but a definite tendency to cut down on the expenses involved in these get-togethers is apparent.

We quizzed the sales executives of important car and truck companies about their show dinner plans recently, and got replies from so large a proportion as to be certain that our conclusions are fairly representative. The query was generated, of course, by the thought that some such trend might manifest itself because of the current business situation. Reading over the interesting letters received, however, we incline to the opinion that only a part of this elimination of elaborateness is due to poor business conditions.

A good many chief sales executives have been questioning the dollar-for-dollar value of these big dinner and luncheon gatherings even during past years of prosperity. There is no way of estimating how much the different factories spend in total for these parties each year, as costs vary materially from year to year and from factory to factory. We'd guess that the costs of these largely social gatherings at New York and Chicago each year total for all factories in excess of $200,000 and sometimes much higher. This is in addition of the sums spent in organizing and running regular business and sales promotion meetings for large and small groups of dealers in all parts of the country.

Direct Results Are the Objective This Year

EACH year we find more executives questioning the value of the mass type of social gathering, and thinking more and more in terms of a larger number of smaller meetings, specific in purpose and business in character. Greater concentration on this latter type of meeting we predict during the coming show season than ever before.

We quote the general sales manager of one company who expresses a fairly general reaction in the following:

"In these times, the matter of expenditure is being seriously considered by all manufacturers and, without doubt, at the coming automobile shows you will see meetings and luncheons greatly curtailed.

"Any meetings that we may have at New York and Chicago will be short and snappy, and the entertainments will be very simple and inexpensive.

"When you really come down to it, not a great deal is accomplished at large meetings; the real work being done at small sectional meetings. The time has arrived when the only things to be done in that direction will be the things which will bring forth direct results."

New Ideas Are To Be Expected

SHORTER meetings, too, will be the rule. Nearly everybody except the long-winded speakers are agreed that the day of the long-winded speaker is past, so far as luncheon and dinner meetings at show time are concerned.

We'll be surprised if there aren't some really new ideas in strictly business contacts and meetings with dealers and distributors developed during show weeks this year. More thought has been given to the subject than ever before and it is inconceivable that some new, bright ideas won't be developed.

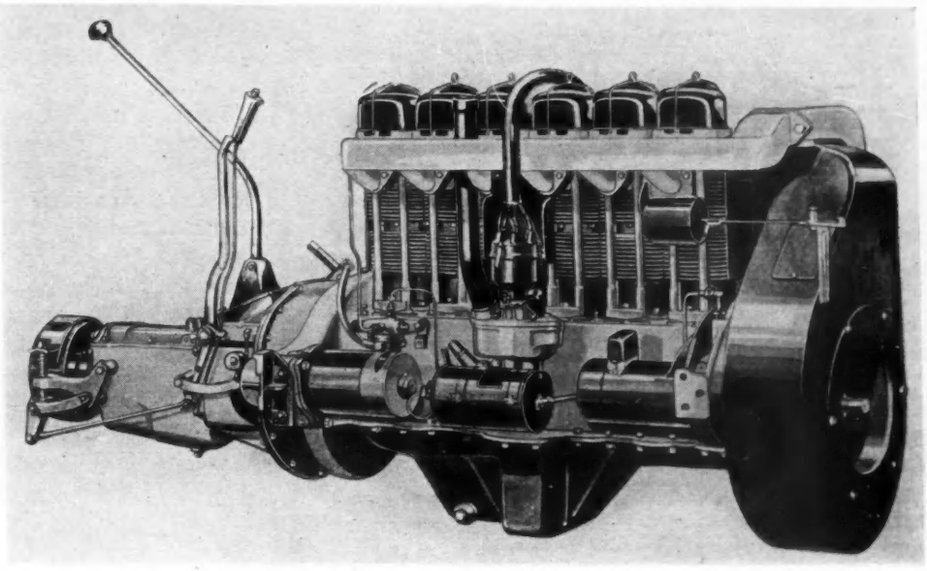
It is certain, at any rate, that the whole tendency is toward individualizing the contact with the retailers to as great an extent as possible. More money may be spent on making possible these individualized contacts than in the past; certainly less will be expended in mass-social-hoopla gatherings.

And the Truck Makers Too—

IT'S a little early yet to tell definitely how strongly the truck manufacturers are going in for dealer meetings and meals. Because trucks will be a part of the New York and Chicago Shows again this year, there is some reason to think that gatherings of commercial vehicle men might be greater rather than less than last year.

So far, however, our contacts with truck company executives indicate that definite plans for such meetings have been consummated only in a few cases.

Certainly truck companies would be missing a bet were they not to take advantage of the promotional value of the shows to bring together groups of interested dealers and dealer prospects.—N.G.S.



Right side of the 1931 six-cylinder air-cooled Franklin engine + + +

Franklin Announces Two Lines With Increased Engine Power

Improvement in the design of the blower reduces the horsepower consumed by it more than half

TWO lines of cars are being offered its dealers for 1931 by the H. H. Franklin Mfg. Co. of Syracuse, N. Y., the Transcontinent and the De Luxe. The differences between them relate mainly to the bodies, but there are differences also in the chassis and the equipments. The chassis for the two series are basically the same and were developed from the 1930 Series 14, the new chassis being known as Series 15. Two lengths of wheelbase are again being used, all of the De Luxe bodies and some of the higher-priced bodies in the Transcontinent line being mounted on the longer, 132-in. wheelbase, while the remaining bodies of the Transcontinent series are mounted on a chassis of 125-in. wheelbase. The body types with prices of the De Luxe and Transcontinent lines are below.

These prices represent reductions from those of the corresponding types of the Series 14. Except where otherwise stated the prices refer to standard wheel equipment comprising five demountable wood wheels. Wire wheels are optional on all models, the additional cost of six wire wheels being $70 in most cases.

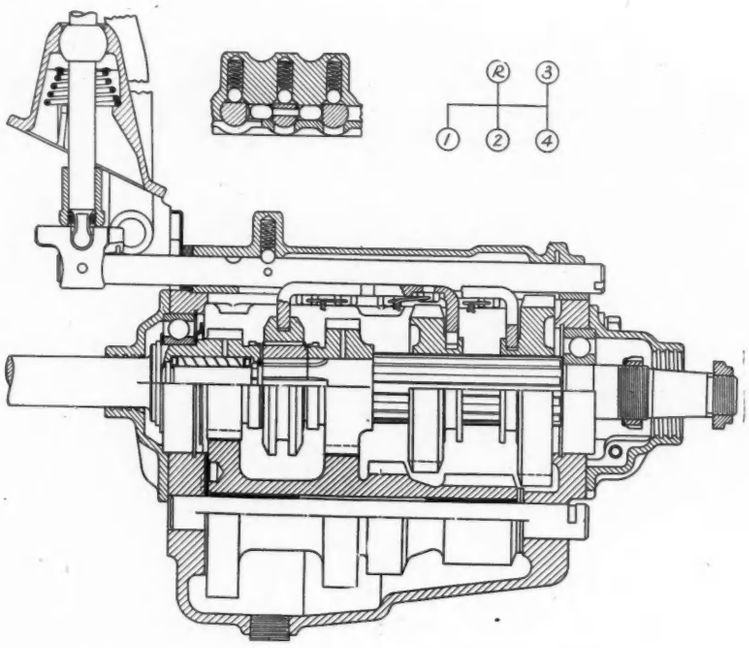
Mechanically the most important improvement over last year's Series 14 is a redesign of the blower, whereby the horsepower consumed by that piece of equipment has been reduced by more than one-half—from 14.5 to 7 at 3500 r.p.m., for instance. This saving in the power consumed by the fan, together with an increase in volumetric efficiency of the engine due to the use of a larger

Series 15 Transcontinent

Sedan (5-pass.)	$2,295
Oxford sedan	2,345
Town sedan	2,425
Coupe	2,345
Conv. coupe	2,395
Victoria brougham	2,395
Pursuit	2,495
Sedan (7-pass. 132-in. w.b.)	2,475
Sport salon (132-in. w.b.)	2,595
Special limousine (132-in. w.b.)	2,725
Roadster (132 in. w.b.), 6 w.w.	2,345

Series 15 De Luxe

Sedan (5-pass.)	$2,695
Sedan (7-pass.)	2,895
Oxford sedan (5-pass.)	2,745
Town sedan	2,775
Club sedan	2,745
Victoria brougham	2,795
Conv. coupe	2,765
Pirate touring (5-pass.) 6 dem. w. w.	2,695
Pirate phaeton (7-pass.) 6 dem. w. w.	2,695
Speedster 5 w. w.	3,345
Limousine	2,995



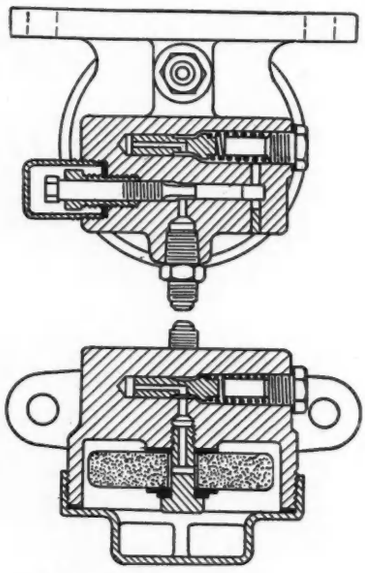
Cross-section and details of four-speed silent transmission

intake yoke, has resulted in an increase in engine power to 100 at 3100 r.p.m. The overhead valve mechanism is now lubricated from the regular engine lubricating system through a special metering valve, anti-drain check valve and filtering device. A four-speed transmission is fitted on all De Luxe models, of a type giving silent third and fourth speeds. This transmission, of which a sectional view is being shown herewith, is manufactured by the Warner Gear Co., but instead of internal gears it uses helical spur gears for the first-reduction and third speed sets. The tread of the De Luxe chassis is 58 in. at the front and 60 in. at the rear, which permits of the bodies being provided with rear seats that are plenty wide for three grown persons.

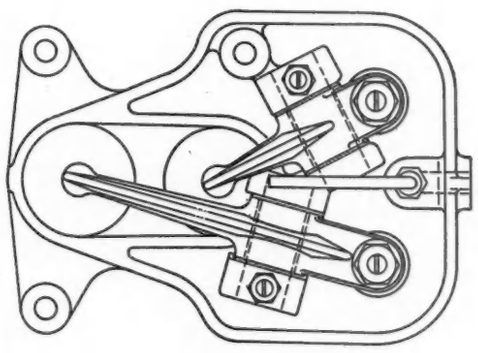
Taking up the improvements in the engine first, the most important, as already mentioned, is that in the design of the blower, which latter, although larger in diameter and rotating at engine speed as formerly, consumes 53 per cent less power. As shown by the drawings herewith, the blades of the blower are now of an entirely different design, their outer portions being bent backward, instead of the whole blade forming a single arc, with the concave side facing in the direction of motion. The number of blades has been reduced from 55 to 32. With the new design of blade, it is claimed, the air is put under static pressure while still between the blades, and its velocity in the blower does not reach such a high value. At 3000 r.p.m. of the engine the new fan absorbs only 4.5 hp.

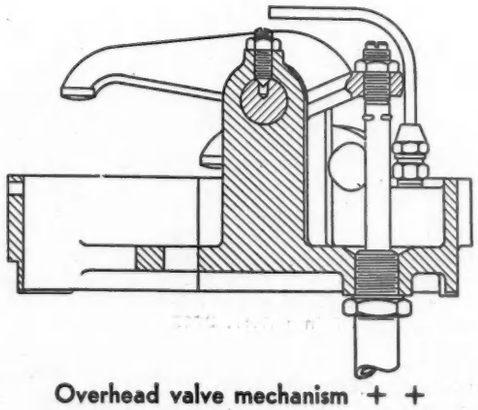
A change has been made in the design of the camshaft, chiefly to improve the idling qualities of the engine. The exhaust period has been shortened and the inlet valve now begins to open 10 deg. of cam motion after the exhaust valve has closed. The diameter of the camshaft between cams has been made larger, which makes the shaft more rigid and quiets the valve mechanism, and it is claimed that one of the most noticeable features of the new engine is that it can be idled down to such a low speed when the car is standing at the curb that one can hardly notice it running. A very slow ramp is another feature of the cam design.

Double springs are used on the valves, as in the past, but these are of a special design, the pitch of the coils increasing from the stationary to the movable end, whereby trouble from spring surge is said to be eliminated. The pressure of the springs in the "closed" position is greater than it was on the Series 14 engine. The exhaust valve guide now is made of bronze, whereas



Valve gearcase oil filter + +



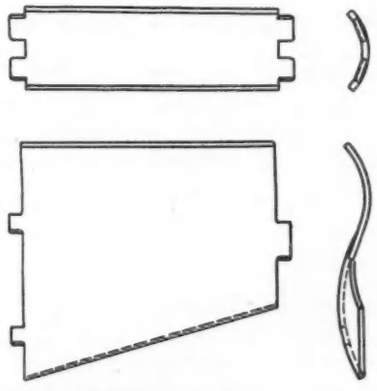


Overhead valve mechanism + +

This view shows the arrangement of the instruments, the new locations of the gearshift and emergency brake levers, and the interior, folding sun visors + +

formerly it was made of steel with a cast-iron insert or bushing. The intake rocker levers are somewhat stiffer to reduce their bending and consequent valve noise.

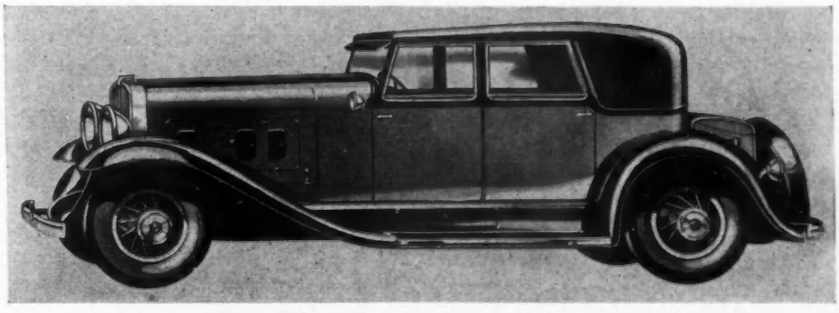
The only change in the carburetor is one in the "cut-off" on the bottom of the choke valve whereby a larger amount of air is allowed to enter the carburetor when choked. The Fuemer, which has been used by Franklin for several years to facilitate starting in cold weather, is continued, but instead of it being supplied with fuel from the float chamber of the carburetor, the fuel is now admitted to it directly from the fuel line through a magnetically-operated valve. This further facilitates starting and eliminates an operation which if neglected sometimes causes damage to the Fuemer.



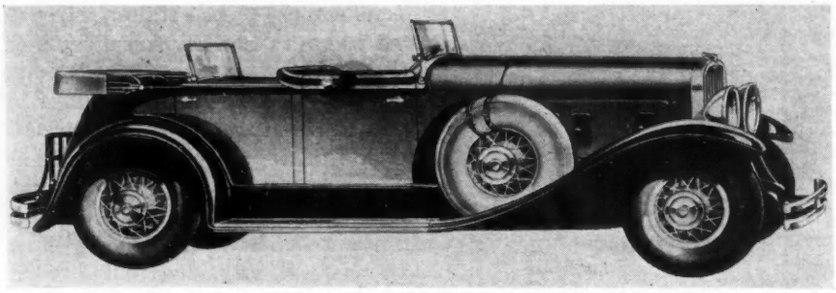
Old (above) and new (below) fan blades

A change has been made also in the method of lubricating the rocker arms of the overhead valve system, which formerly were supplied with oil by a separate pump operating automatically. These bearings are now supplied with oil from the regular engine oil pump but through a special metering valve, anti-drain check valve and filter, of which two sectional views are shown herewith, the equipment being supplied to the Franklin company by Bowen Products Corp. A lead is taken from the outlet of the oil filter and connected to the special fitting on the right side of the engine near the rear. The oil enters a chamber in this fitting and is then compelled to pass through a special filtering element of artificial stone. Thence it flows through drilled passages to a check valve which prevents the passages beyond this point from being drained during periods of idleness of the engine. Finally it passes through a needle valve with very small taper which permits of a very fine adjustment of the rate of feed. From this fitting a tube leads to the cylinder heads, where the oil is distributed to the different valve chambers through a header with hard-soldered joints. It is discharged onto a felt pad which conducts it to the different bearings to be lubricated. Excess oil gathers at the bottom of the valve chamber and returns to the crankcase through the push-rod tubes, the rods being flatted off for the purpose where they pass through bearings. The oil header, being made in a single piece by hard-soldering and secured to the valve covers by means of cap screws and gaskets, reduces the chance of leakage developing at these points, and a further advantage of the new arrangement is that the operator need pay no attention to the oil supply for valve rocker lubrication, since the crankcase supply is made use of. Cork gaskets are used between the rocker case and the cylinder head, and a copper-asbestos gasket between the rocker case and the nut on the supporting tube, which gaskets prevent oil from the valve chamber from leaking out and getting onto the outside of the engine.

A hot-air deflector is secured to the right side of the engine. Air that has been blown over the engine cylinders for cooling enters this deflector from the side and leaves it at the bottom, so none of it comes in contact with the dashboard, and consequently the engine heat does not render the driving compartment uncomfortably warm in summer time. In winter, when it is desired to use the engine heat for keeping the front



The De Luxe Speedster is a closed sport car seating four



The Transcontinent Pursuit model. The cockpit with its separate windshield seats two

compartment warm, a door on the outside of the deflector can be removed, which renders it practically ineffective.

Rear engine mountings on the De Luxe models are now on Firestone rubber pads. Connecting rod bolts have been increased in size from 3/8 to 7/16 in.

A lug has been added to the ignition unit which serves as a stop limiting the angular motion of the unit for spark advance and retard, and also gives a better ground connection.

The oil pump gears are now made with smaller helix angle and an increased number of teeth to increase the pumping capacity. The return pipe from the oil filter now runs to the inspection hole for the front-end drive chain, whereby a larger quantity of oil is supplied to the chain.

Instead of using a fabric guard for the ignition unit as in the past, a sheet metal guard is used. This keeps the hot air from the engine and any water held in suspension by it in wet weather away from the ignition unit, and it also keeps the unit cooler.

New Four-Speed Transmission

Details of the new four-speed transmission may be gleaned from the sectional view reproduced herewith. The two pairs of meshing gears at the engine end are cut with helical teeth and remain in mesh continually. Engagement of the direct drive and the third speed forward is effected by means of a sliding collar cut with internal teeth, over a spur pinion splined to the driven shaft and spur-tooth extensions of the two helical gears on the upper shafts. The shifter bars of the transmission extend forward beyond the transmission housing, and the base of the shift lever extends up through the toeboard instead of the footboard, thus facilitating ingress to and egress from the driver's seat. The emergency brake lever, which heretofore has been located to the left of the driver's seat in Franklin cars, is now at the center.

The rear axle remains generally of the same design, but the tread has been increased from 58 to 60 in., malleable iron is used instead of aluminum for the center housing (whereby the rigidity of the axle structure is increased), the underrunning truss has been increased in diameter from 3/8 to 1/2 in., lubrication facilities of the differential gear have been improved, and the oil seal on the rear-axle pinion shaft is now made of leather.

The front axles are still of tubular design, but the welds by which the steering heads are secured to the tubular portion are at the very ends and therefore do not weaken the tube, which latter is of somewhat larger diameter than formerly (2 5/8 instead of 2 9/32 in.). The spring saddles are now clamped to the axle tube instead of being welded on, and U-shaped spring clips pass over the axle tube.

Chassis springs continue of the full-elliptic type, but instead of spring eyes being welded to the master leaves, the eyes are now formed by rolling, doing away with possible weakness of a welded joint. Delco shock absorbers are now fitted all around.

The running board is of new design. It is covered with plain black rubber, and on top of this there are five substantial lengthwise rubber strips which are held in place by metal strips. The molding along the outside is chromium-plated. The hood-front shutters (corresponding to radiator shutters on a water-cooled car) now have a dull-finish chromium plating and are provided with anti-rattle springs. The hood is of new design, with concealed hinge and with a raised panel on each side, in each of which there are three doors.

Headlamps now have a ball-and-socket mounting, which facilitates adjustment for aiming of the beam. Cowl lights replace the fender lights of the Series 14. At the rear there is now a combination tail, stop and back-up light.

Battery and tool compartments are arranged on opposite sides of the car and are accessible from the outside, the tool box cover being provided with a lock to prevent the theft of tools. Hydraulic brakes of the same size are continued, but the pedal motion reduction ratio has been increased, which reduces the pedal pressure required.

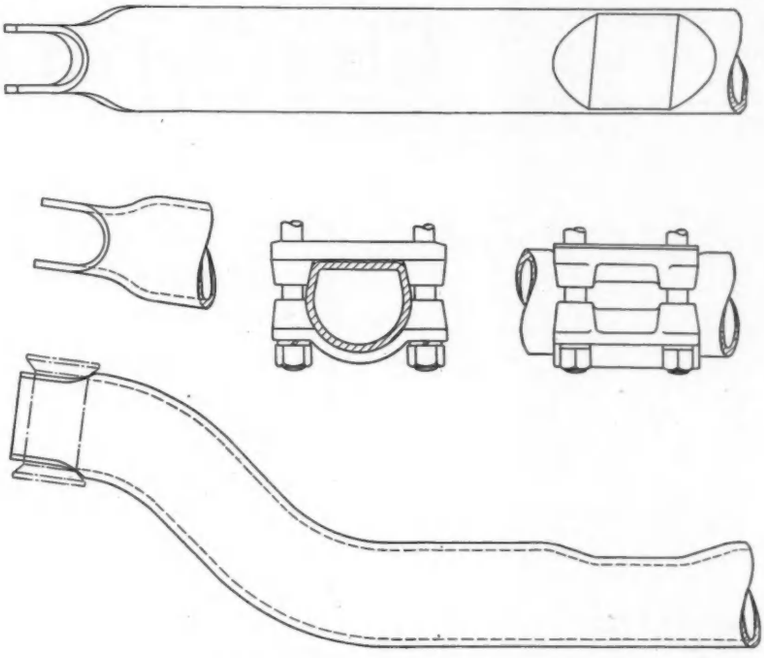
A new type of folding trunk rack of ornamental effect when not in use is standard equipment on four models. Single-bar bumpers are used, and those at the rear are of the "all-across" type, instead of the usual bumperettes. A new design of fuel tank apron is fitted which harmonizes with the new rear fenders.

The frame side rails now have a cross-section 1/2 in. deeper and the reinforcing insert has been extended 12 in. farther to the rear, in addition to which a new cross-member has been added directly behind the rear engine support to make up for the loss of the cross-member effect of the engine support due to the use of rubber mountings.

The above chassis description applies particularly to the De Luxe series, but the chassis of the Transcontinent series have the same engine, thus embodying all of the engine improvements mentioned.

As regards bodies, the new De Luxe designs are lower, longer and wider than those of the Series 14, and they have a distinct "closer-to-the-ground" effect. One of the most important changes from the Series 14 is the adoption of slanting windshields on all closed models of the De Luxe series.

(Turn to page 696, please)



Details of Logangear tubular front axle

New Logangear Front Axle is Lighter Than Forged Type

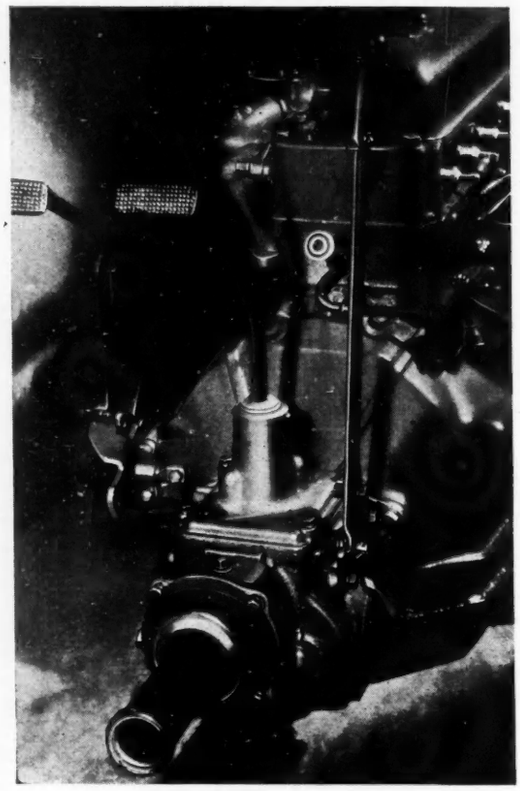
A TUBULAR front axle embodying a number of features of design is now being manufactured in the Logangear plant at Milwaukee, Wis., under license from its inventor, B. H. Urschel of the engineering company bearing his name. At present the axle is used in regular production on Franklin and Willys-Overland 98-D (Whippet 6) cars.

While a casual examination shows little difference between the Urschel-Logangear axle and others of the tubular type, more detailed study will reveal several noteworthy points in the design of the ends and in the method followed in its manufacture. The axle is believed to be the first of what may be termed the non-insert-end type, since instead of having inserted ends in which the spindle bolt is supported, the ends of the tube itself are formed and welded around a spool through which the bolt is inserted and locked in position. It also has been the accepted practice to pin or weld the spring pad in place. In this axle a "padding" operation is performed on the tube at points where the spring pads are to be attached, and certain types of pads can be used without welding them to the tube. These pads are clamped around the axle tube with a wedging contact against the inclined faces formed on the tube adjacent to the flattened top. The top part of the pad is broached to conform with the "padded" section of the axle, but a clearance of about 0.010 in. is left between the pad and the flat top of the tube.

The axle is of hot-rolled seamless steel tubing to S.A.E. 1040 specifications and the spools are of S.A.E. 1025 steel. The tubing is received from the mill in the annealed condition and all forming operations are done in the cold state. After forming and welding in the spools, the axle is subjected to a heat treatment consisting of quenching from 1550 deg. Fahr. in water, in the Urschel axle-quenching machine, followed by a draw to 800 deg. Fahr. The ends are then drilled and reamed and the finished axle is inspected in a special gaging fixture. This is followed by attachment of the spring pads.

The makers claim that this type of axle saves from 25 to 30 per cent in weight when compared with a forged axle of similar strength and particularly stress the importance of the uniformity of the metal obtained when rolled tubing is used.

A detailed description of the operations performed in the manufacture of this axle will be presented in a later issue of *Automotive Industries.*

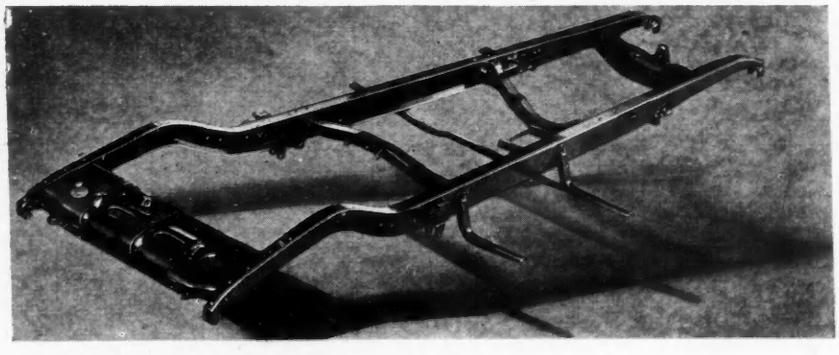


The clutch and transmission housing has been newly designed for greater accessibility + + + + +

Chevrolet in the Ring

Longer bodies, with a totally different appearance of the front end, more sweeping fenders, improved visibility for the driver and a newly designed cooling system are conspicuous features in the new line to be offered + + +

CHEVROLET MOTOR CO. makes its bid for a share of the popular-priced market for 1931 on the basis of substantially lower prices, a longer wheelbase, larger bodies and a host of detail improvements contributing to increased smoothness and comfort, greater reliability, easier servicing, longer life and improved appearance. There are no radical mechanical changes. The wheelbase is now 109 in. or 2 in. more than last year. Facilities of the domestic Chevrolet plants were to start production on the new cars early this month, anticipating the usual beginning of production on a new Chevrolet model by several weeks.



The chassis frame has been lengthened and greatly strengthened + + +

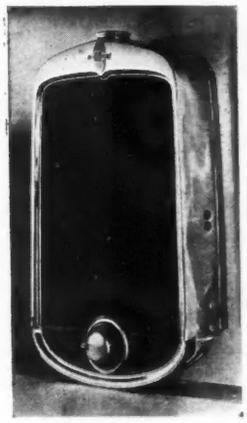
Nine body models are included in the line, compared with eight last year, the new model being a coupe with rear quarter windows. The club sedan is replaced by a "special sedan," which is fitted with six wire wheels and fender wells. Radiator grilles, chrome-plated, are standard equipment on all sport models including this sedan. All except this model carry five wire wheels, with the spare at the rear, as during the last few months of the 1930 season.

Aside from the longer bodies and hood obtained with the increased wheelbase, probably the most marked change in appearance is at the front end. A conventional radiator splash pan has been substituted for the horizontal pan used last year, and a new radiator outline has been developed, extending downward around the black enameled false bottom. An arched headlamp tie-bar has been adopted, curving continuously from fender to fender, and a high-frequency flat vibrator type horn is mounted below the left headlamp.

From the side also, several changes are readily apparent. There is the coach sill effect of the deeper body side and door panels. Front fenders have been raised slightly, and rear fenders are more sweeping. Running boards are longer and narrower at the front. The rubber covering which is vulcanized to these pressed steel "boards" is curved over the outside edge, chrome moldings covering the edges of the rubber. Body moldings are now stamped integral with the side panels, for manufacturing simplicity and for greater strength. The belt line is higher, and the molding continues out over the hood in such a manner as to conceal the higher side hood hinges. There

With Nine New Models

by Athel F. Denham



A new radiator outline has been developed + +

A lower driver's seat, a higher windshield top header bar and the three-spoke steering wheel are notable changes

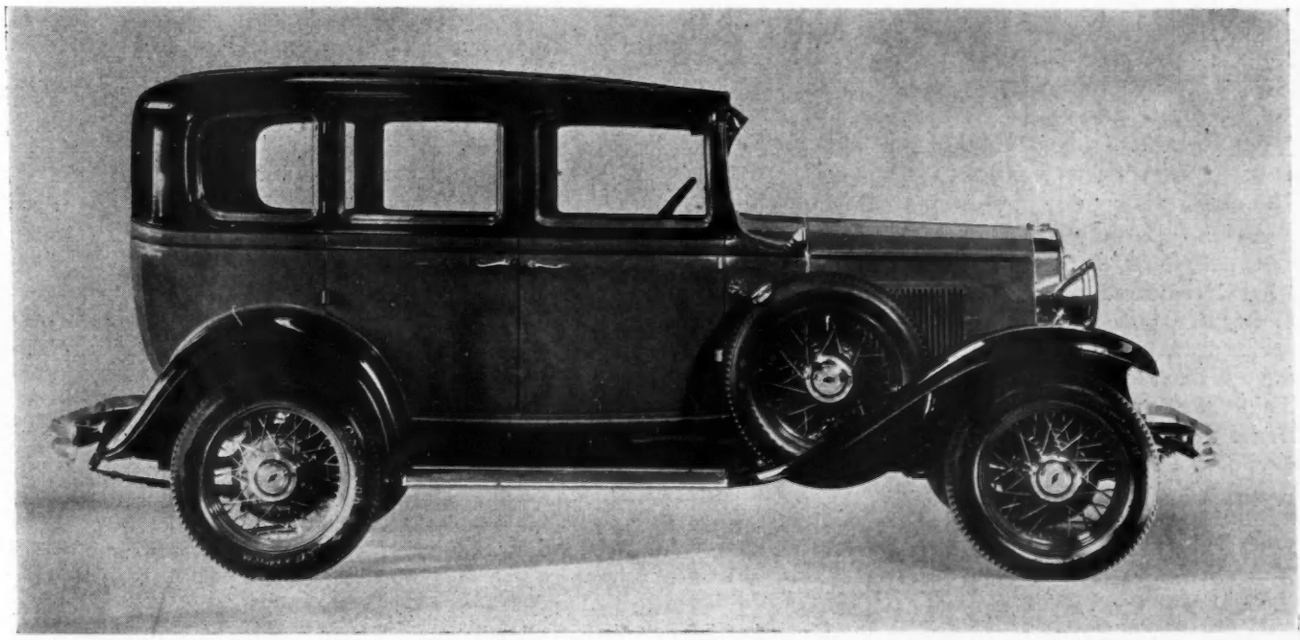
are more louvers in the hood and they are placed farther back.

Head and tail lamps are chrome-plated, and the latter is mounted on the left rear fender on the new models. Chrome-plated cowl lamps are supplied on the sport models. Viewed from the rear, the main change is in the pan covering the gas tank, which has been improved in appearance.

Visibility from the driver's seat has been improved by lowering the seat and raising the windshield top header bar. Mohair or broadcloth upholstery are optional on the closed models. There is a three-spoke steel-core rubber-covered steering wheel, and the door handles are of the locking type. Automatic windshield wipers are now found on all open as well as closed cars. They have an automatic blade return.

Front compartments are insulated against heat,

(Turn to page 696, please)



The new Special Sedan is fitted with six wire wheels and radiator grilles chrome-plated

Coiled versus Leaf Springs

Coiled springs weigh only about half as much as leaf springs when designed for the same work

By P. M. Heldt

IN the instalment of the series on Independent Springing in the issue of Sept. 27, the writer briefly discussed the relative load capacities of coiled springs and leaf springs respectively. An error was made in that discussion in assuming the energy stored in a spring to be proportional to the stress in the spring, whereas, as pointed out by a correspondent, it is proportional to the square of the stress. The analysis otherwise also was somewhat crude and will therefore be repeated here.

That the load stored up in fiber stress in elastic material when uniformly stressed is proportional to the square of the stress may be easily proven as follows: Considered a steel bar of 1 sq. in. cross section and 1 in. long, and let a force P be applied to it at one end, the other end being anchored. The bar will then be stretched an amount P/E, where E is the modulus of rigidity of the material in tension. The resistance which the bar offers to the stretching force starts with zero and increases uniformly to P, hence the mean resistance is $P/2$. This resistance is overcome through a distance P/E, hence the work done in stretching the bar is

$$P/E \times P/2 = P^2/2\,E.$$

Since the force P acts on a cross section of 1 sq. in. it is equal to the stress S, and we may therefore write

$$W = S^2/2\,\mathrm{E} \text{ in.-lb. per cu. in.}$$

Now, in a leaf spring the material is not uniformly stressed, since in a cantilever beam the stress is greatest on the fibers of the upper and lower surfaces and decreases uniformly from the surface to the fibers in a plane midway between these two surfaces, through what is referred to as the neutral axis. Referring to Fig 1, which represents a cross section through a spring leaf, if the stress on the outer fibers, at a distance c from the neutral axis, is S, then the stress on the fibers at a distance x from the neutral axis is $S\,x/c$. Hence the energy stored in unit volume of the spring steel at a distance x from the neutral axis is

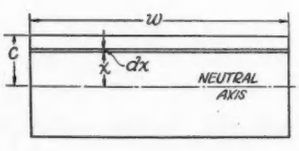


Fig. 1 — Cross-section through a spring leaf

$$(S\,x/c)^2/2\,E$$

If we take a unit length of the leaf, the volume of the two infinitesimal layers at a distance x from the neutral axis is $2\,w\,dx$, where w is the width of the leaf. The amount of energy stored in these two layers therefore is

$$[\,(S\,x/c)^2/2\,E\,] \times (2\,w\,dx) = S^2\,w\,x^2\,dx/E\,c^2$$

and to find the amount of energy stored up in the entire section of the leaf 1 in. long we integrate this expression between the limits $x = 0$ and $x = c$, which gives

$$\int_{x=0}^{x=c} \frac{S^2\,w\,x^2\,dx}{E\,c^2} = \frac{S^2\,c\,w}{3\,E} \text{ in. lb.}$$

Now the volume of a 1-in. section of the leaf is $2\,c\,w$, and the energy stored per cu. in. therefore is

$$\frac{\dfrac{S^2\,c\,w}{3\,E}}{2\,c\,w} = \frac{S^2}{6\,E}$$

If we assume the stress S to be equal to one-half the elastic limit L of the material in tension, then $S = L/2$ and $S^2 = L^2/4$ which when substituted for S^2 gives for the stored energy

$$W = L^2/24\,E \text{ in.-lb. per cu. in.}$$

In the coiled spring the material is worked in torsion. If the torsional moment on the spring wire is M, the angle through which this wire is twisted is given by the equation

$$\theta = \frac{M\,l}{F\,J} \text{ radians,}$$

where l is the length of the wire in in.; F, the modulus of torsional rigidity and J, the polar moment of inertia of the section of the wire. For a round wire $J = (\pi/32)\,d^4$, where d is the diameter of the wire. Inserting this value of J in the foregoing equation we get for unit length of the wire—

$$\theta = \frac{32\,M}{\pi\,d^4\,F} \text{ radians.}$$

Now the stress induced in the surface fibers of the wire by a moment M is

$$S = \frac{16\,M}{\pi\,d^3},$$

so that

$$M = \frac{\pi\,d^3\,S}{16}$$

By substituting this value of M in the expression for θ we get

$$\theta = \frac{2\,S}{F\,d}$$

Now the work done in overcoming a constant moment M through an angle θ radians is $M\,\theta$ in.-lb. In our case the resisting moment increases uniformly from O to M, hence the average resisting moment is $M/2$ and the work done is $M\,\theta/2$. Substituting the values found for M and θ we get

$$W = \frac{1}{2}\,\frac{\pi\,d^3\,s}{16}\,\frac{2\,S}{F\,d} = \frac{\pi\,d^2\,S^2}{16\,F}$$

The volume of the wire 1 in. long is $\pi\,d^2/4$, and the work done (or energy stored) per unit of volume therefore is

$$W = \frac{\frac{\pi\,D^2\,S^2}{16\,F}}{\frac{\pi\,d^2}{4}} = \frac{S^2}{4\,F}$$

Now let us assume that S is equal to one-half the elastic limit in torsion L_1 of the material of the wire, so that the factor of safety is the same as in the case of the leaf spring. Then $S^2 = L_1^2/4$ and making this substitution we get

$$w = L_1^2/16\,F \text{ in.-lb. per cu. in.}$$

Therefore, the ratio of the amounts of energy stored per cu. in. in a leaf spring and in a coiled spring respectively when they are stressed to the same proportion of their respective elastic limits is

$$\frac{\frac{L^2}{24\,E}}{\frac{L_1^2}{16\,F}} = \frac{16\,F\,L^2}{24\,E\,L_1^2}$$

Now the modulus of torsional rigidity F for spring steel is about 12,000,000 and the modulus of rigidity in tension for the same material, 30,000,000, so that $F/E = 0.4$. Figures quoted in the previous article from a publication of the National Physical Laboratory of England indicate that $L/L_1 = 100/70$ so that $L^2/L_1^2 = 100/49$. Therefore, the relative energy-storing capacities are

$$\frac{\text{Leaf spring}}{\text{Coiled spring}} = (16/24) \times 0.4 \times (100/49) = 0.544 \text{ or } 54.4 \text{ per cent}$$

Actually the coiled spring is still more in the advantage, in that the stresses are uniform over the whole of its active length, which is not the case with the leaf spring. Coiled springs therefore weigh only about half as much as leaf springs when designed with the same factor of safety for absorbing the same shocks or for carrying the same loads under the same conditions.

Franklin Announces Two Lines

(*Continued from page 688*)

This obviates glare from headlights of cars behind and slightly reduces the air resistance for the same frontal area. In changing from the vertical to the inclined windshield the "clear vision" feature has been retained, the pillars being of uniform section over their entire height. Front doors are widened, and the rear-quarter metal panel of the roof has been extended the entire length of the roof and also made deeper. Metal lock "boards" replace the wooden ones formerly used. Inside visors are standard equipment on all closed models; when not in use they fold into a horizontal position against the headlining material. Dual windshield wipers are furnished, both operated by the same motor, which is concealed on the inside of the driving compartment.

Except in the victoria-brougham, which has individual bucket seats of which the driver's seat is adjustable fore and aft by means of a bolt and the passenger's seat is of the folding type to give access to the rear compartment, and of the limousine, which has fixed front seats, the front seats of all Series 15 cars are adjustable.

The instrument board and cowl-arch cover are combined in a one-piece stamping. The instruments are mounted so as to appear in individual openings in the board, and on each side of the instrument board there is a generous pocket for gloves, maps, etc. A change has been made in the instruments carried, in that the oil-pressure gage of last year's series has been replaced by an oil-quantity gage.

The footrest is of a new design, with much larger brackets, finished in Butler nickel to match the interior hardware. The rest portion is a carpet-covered oval bar of substantial proportions. The width and depth of the rear-seat cushion and the depth of the rear trim back have been increased to give additional comfort. Rear seats are now 1½ in. wider, which is made possible by the increase in rear tread to 60 in.

The Forum

Coil vs. Leaf Springs

Editor, AUTOMOTIVE INDUSTRIES:

In his excellent and timely article on Individual Wheel Suspension in your issue of Sept. 27, Mr. P. M. Heldt has let slip an error which does the coil spring somewhat of an injustice. In proving that the leaf spring and the coil spring weigh approximately the same for similar deflection rate and maximum load, your contributor made the assumption that the energy content of steel varied directly as the fiber stress, and in the same proportion for both shear and tension. Of course the variation is proportional to the square of the fiber stress, and inversely proportional to the modulus of elasticity, so that

$$W = f^2/2E$$

where W is the energy content, per unit vol.
where f is the fiber stress
where E is the modulus of elasticity.

The modulus of elasticity of steel is 2.5 times as much in tension as in shear, so that at any given fiber stress the energy content is 2.5 as much in shear as in tension. Also, the elastic limit in shear is about 2/3 that in tension so that the energy content at the elastic limit is 2.5x4/9, or 1.1 times as much in shear as in tension. As Mr. Heldt has pointed out, the coil spring uses its material 50 per cent more efficiently than the leaf spring, so that the weight-energy ratio will be 1.65 times better for the coil spring. Of course, the fact that the leaf spring is capable of functioning as a radius rod and torque tube combined makes its extra weight worthwhile to the designer.

I have built three experimental individually sprung suspensions with coil springs, and from the performance of those and of the little Lancia, I am convinced that the coil spring is the ultimate means of suspension. The question of individual suspension has been dodged long enough now, and I sincerely hope that Mr. Heldt's contribution will prod somebody into action.

F. J. HOOVEN.

(Mr. Hooven is correct in stating that the amount of energy stored is proportional to the square of the stress instead of directly to the stress, and this makes the case of the coiled spring look considerably more favorable. An article appearing in this issue deals further with this subject.—*Editor.*)

Why Not Spring Wheels?

Editor, AUTOMOTIVE INDUSTRIES:

Referring to your article on Independent Springing of Automobiles and the four methods you list, I have wondered if spring wheels could not be worked in at this stage of the game. Spring wheels would mean reducing unsprung weight to the minimum and general construction of frame, axles, steering and brake mechanism to the simplest possible form.

Out of the many hundred of spring wheel patents it looks like some practical type could be found that could be used on light cars at least, if not the heavier ones. Of course, most all spring wheels were designed to eliminate pneumatic tires, but since this is not necessary, maybe now they could be developed to take the place of the present methods of springing. I do not have any particular interest in spring wheels but simply want to see automobiles reduced in cost and construction simplified, so if you can give us a chapter along this line I am sure the engineering fraternity as well as the public would appreciate it.

JOS. N. PARKER.

Effect of Dilution with Spent Gases on Detonation

Editor, AUTOMOTIVE INDUSTRIES:

If it is not too late, may I refer to an article in your issue of the 5th July, 1930, entitled "Compression Pressure is Controlling Factor in Inducing Engine Knock"?

I am surprised to find that the author, Mr. Rubenz, nowhere refers to the effect upon engine knock of a variation in the proportion of exhaust gas which must be left in the combustion space of the engine, and will dilute the incoming charge of air-fuel mixture. While this effect does not, of course, alter the value of the author's interesting method of comparing knock qualities, it is of vital importance in assessing the effect of a rise in compression pressure upon detonation, or engine knock.

As long ago as 1921 it was shown by Ricardo (see *Aeronautical Journal,* London, 1921) that the addition of an extra 10 per cent of cooled exhaust gas to the ingoing charge was equivalent to adding about 60 per cent of benzol to an average petrol, so far as the compression ratio at which knocking began, was concerned. The effect in suppressing detonation is produced by the high specific heat of the gas composing the exhaust gas.

According to Fig. 3 of Mr. Rubenz's article (the titles of Figs. 2 and 3 appear to have got transposed), a change in the manifold vacuum of 40 in. of water corresponds to a reduction of volumetric efficiency from 100 to 50 per cent. In other words, the proportion of exhaust gas which dilutes the fresh charge will be doubled during that change in manifold vacuum, and

one may suspect that the effect of this large increase in the proportion of exhaust gas may have quite overshadowed any effect of the change in compression pressure.

The relation between volumetric efficiency and manifold vacuum illustrated in the figure referred to would have been more easy to understand if the method of measuring these two quantities had been stated. Without further explanation, it appears strange that a drop of manifold pressure of approximately 10 per cent, this being equivalent to an increase of manifold vacuum from 3.8 to about 46 in. of water, should have halved volumetric efficiency.

D. R. PYE,
London, England.

How to Specify Fuel Oil for Diesel Engines

Editor, AUTOMOTIVE INDUSTRIES:

In the Swedish *Teknisk Tidskrift* of Sept. 13, 1930, there appears an article on "How to Specify a Fuel Oil for Diesel Engines," by E. Pyhala, which contains some points that may interest your readers. A fuel oil of the following specifications was bought in the open market:

Specific gravity at 15 deg. C., 0.860.
Ignition point (Pensy-Martens), 86 deg. C. (187 deg. Fahr.).
Viscosity, 1½ deg. Engler at 20 deg. C. (68 deg. Fahr.).
Color, black.

It was impossible to burn this fuel oil satisfactorily in a good, slow-running Diesel engine, as it gave too little power and produced too much smoke. In order to further investigate this fuel oil, it was subjected to fractional distillation which gave the following results:

26 per cent of the oil distilled over at up to 250 deg. C. (482 deg. F.).
45 per cent distilled over between 250 and 300 deg. C. (482-572 deg. Fahr.).
21 per cent distilled over between 300 and 350 deg. C. (572-662 deg. Fahr.) or a total of 92 per cent up to 350 deg. C. (662 deg. Fahr.).

Apparently this oil contained too little of the more easily ignitable lighter fractions which provide heat for the combustion of the heavier fractions; incomplete combustion of the more complicated hydrocarbons was the result. Another oil with following specifications was then obtained:

Specific gravity at 15 deg. C., 0.840.
Ignition point (Pensy-Martens) 74 deg. C. (165 deg. Fahr.).
Viscosity, 1.3 deg. Engler at 20 deg. C. (68 deg. Fahr.).
Color, black.

This fuel oil gave good combustion and power in the same engine as above. Its fractional distillation gave the following results:

51 per cent of the oil distilled over at up to 250 deg. C. (482 deg. Fahr.).
30 per cent distilled over at from 250 to 300 deg. C. (482-572 deg. Fahr.).
10.6 per cent distilled over at from 300 to 350 deg. C. (572-662 deg. Fahr.) or a total of 91.6 per cent going over at up to 350 deg. C. (662 deg. Fahr.).

From the distillation characteristics of these two fuel oils it is clear that if good results are to be obtained, particularly in high-speed Diesel engines, the fractions which pass over below 300 deg. C. (572 deg. Fahr.), should be around 80 per cent of the total, not 70 per cent, as in the first case. Further, half of this amount, at least, should pass over below 250 deg. C. (452 deg. Fahr.), and 92 per cent should pass over below 350 deg. C. (662 deg. Fahr.).

The fractions distilling below 250 deg. C. (482 deg. Fahr.) must be depended upon to produce an early ignition, and to then generate enough heat to burn the fractions of more complicated molecular structure, which may be expected to develop during the combustion process in the Diesel cylinder.

The ordinary fuel oil specifications do not provide a safeguard against unsuitable fuel oils, as shown by the example mentioned, but the fractional distillation test will do it.

Apparently, fuel oil may contain a few per cent of asphaltic matter, and still be a satisfactory engine fuel, provided this heavy stuff is balanced by a greater percentage of lighter fractions.

A considerable amount of heat is required to produce the high temperature necesary to burn the heavy-molecular hydrocarbons which remain in the fuel mixture, and which supply an important part of the fuel's energy content.

If an oil contains unsaturated, powerful reactive hydrocarbons, more care must be taken to supply ample heat to burn these fractions.

HUGO MOREN.

ACCORDING to the annual report of the American Bureau of Metal Statistics, on the use of non-ferrous metals in the automobile industry, approximately 120,550 tons (of 2240 lb.) of copper, 35,700 tons of zinc, 17,000 tons of tin, 16,070 tons of lead and 33,930 tons of aluminum were consumed. Figuring on a total production of 5,358,420 motor vehicles in the United States in 1929, this gives an average per car of about 50 lb. of copper, 6.7 lb. of lead, 15 lb. of zinc, 7.1 lb. of tin and 14.2 lb. of aluminum.

BULLETINS 811130 to 81530, describing representative furnace equipment for automotive requirements made by George J. Hagan Co., Pittsburgh, Pa., are now ready for distribution.

Slide-rule is Scepter in Industry Today

(Continued from page 677)

rut; that the mental lethargy of their engineering departments is but a reflection of their own former attitudes. And, strangely yet humanly enough, they want to change overnight an attitude on the part of their engineers which they have carefully fostered and insisted upon for years. So they called upon me, the former mechanical radical, to pull a few mental rabbits out of the hat.

This personal experience is related only to prove definitely to the engineer what a great field is open—what a vista of opportunity is before him. If he can produce, he is king as never before.

And the best part of it all is, there never was a time when there were more original paths to tread. Never have there been lying around loose so many ideas to develop, so many things to improve, nor so much to accomplish—all leading to finer and better motor cars; newer standards in performance, in riding, steering, braking—in every single factor, in short, that goes to make the modern motor car.

It was C. F. Kettering, I believe, who said that the engineer's duty is to keep his public constantly dissatisfied by making today's product so much better than yesterday's that the public will always want the new. How much truer is that today than ever before in our industry. How much easier it is to get acceptance for the new than ever before. In the grasp of the engineer is the final solution of the used car problem. Make the new cars so different, so much better than the old that no one will even want the old car except as junk. The public can well afford to junk its old cars, provided the new cars are sufficiently superior and economical.

But here's the big question: how many of our automotive engineers are equal to the opportunity which now presents itself?

No longer is there any doubt about the chance for the engineer; from here on it's a question of the engineer's ability to measure up to his chances.

An engineer without mental power, intellectual vitality, vigorous creative ability is no better off in this new era of technical opportunity than he was in the Dark Ages of mechanical conservatism.

But there is every reason to believe that the engineers of the industry either are equipped or will equip themselves to meet this vital test. Some will cringe and fail; but most will leap to accept the challenge of opportunity which economic destiny has flung down. It is inconceivable that it should be otherwise.

For the creative mind, the intellect which harbors the originative spark, the horizon of achievement stretches wider than at any other moment since the industry's dawn.

Premiums for creative genius will be multiplied. Rewards for mediocrity will be correspondingly decreased. This is the day of advancement.

I predict that technically the motor vehicle will change more in the near future than in any like space of time in its history. I should think that the automotive engineers of America would feel like shouting:

"It's great to be a real engineer in such times as these."

Next Week—

Mr. Moskovics writes another exclusive, vital article for Automotive Industries under the provocative title:

"If I Were an Active Engineer Today—"

In the accompanying article, he tells of the opportunity which lies before for the automotive engineer today. In next week's dialectic he tells specific ways by which the engineer can equip and keep himself fit for fulfillment of that opportunity.

Chevrolet in the Ring With Nine New Models

(Continued from page 691)

cold and noise, by covering the dash and floor boards with a felt composition, over which goes the usual rubber floor mat. Rubber covering is also used over the insulating material on the dash.

Of particular interest among improvements in the chassis is the work done to impart greater rigidity to the engine. As is well known, the cylinder block of any engine weaves a certain amount while running, which is reflected mainly in vibration. In the 1931 Chevrolet this weaving tendency has been markedly reduced by the application of material at the right points. The crankcase roof on both sides has been made thicker, especially on the valve side. Then there is an external horizontal rib, 5 in. long, tying cylinders Nos. 3, 4 and 5 together near their base, and on the valve side the vertical ribs on the cylinder outside walls have been extended down to the roof of the crankcase. It is said that by a 1½ per cent increase in weight a more than 40 per cent increase in rigidity has been obtained.

The crankshaft also has been made more rigid by the addition of more metal to the cheeks, and the harmonic balancer adopted during the 1930 season is

continued. Piston rings exert a somewhat higher wall pressure, especially the oil ring, for lubrication control. Pushrods and the spherical sockets at their upper ends, which were formerly in two pieces fitted together, are now made integral, to eliminate a possible source of rattles, etc. Coils of valve springs have a variable pitch to reduce surging. The crankcase ventilating system has been changed to conduct the engine fumes out below the pan, rather than into the carburetor, as an added protection against corrosion. An oil separator is included in this system, which is combined with the oil filler.

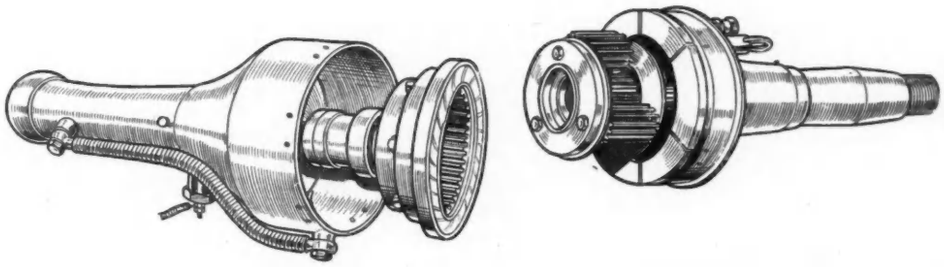
In the cooling system the radiator core has been increased in capacity, the water pump has been improved in detail, and better air circulation has been obtained by increasing the number of louvers and locating them farther back on the hood.

A rubber boot has been placed over the accelerating pump on the carburetor to protect it against moisture, and thus prevent freeze-ups in winter. Spark plugs are of a cooler-running type, standard equipment being A.C. G-12. During the 1930 season a steel ring gear on the flywheel was adopted. This is continued. Valve rocker boxes have been improved against oil leakage. The air cleaner is of the copper-mesh type. In the exhaust system a less rigid mounting for the muffler has been worked out.

Molded facing has superseded the woven type on the clutch plates. Further changes include the adoption of a ball bearing for the clutch pilot instead of a bronze bushing, and the provision of three removable pieces on the clutch housing for accessibility. A spherical pivot replaces the yoke bracket and pin on the clutch for mounting.

For easier servicing, the transmission case has been made removable without disturbing the clutch housing, and has also been stiffened. Nickel-molybdenum carbonized steel has been adopted for countershaft gears, for longer life. Other chassis changes include heavier section I-beams for the front axles, a longer third member for the rear axle to take care of the increased wheelbase, while using the same propeller shaft as on the 1930 series, adoption of a higher ratio, 12 to 1, worm and sector steering gear for easier handling, larger shackle bolts, a change in the U-bolts for rear springs, placing these parallel to the axle housing, and providing the mounting with an alemite fitting to decrease wear, and a 50 per cent increase in torsional rigidity for the frame.

This added frame strength has been obtained by increasing the side-member depth by ¼ in., by a ½ in. increase in the width of the top flange (now 2¼ in.) and by strengthening the various cross-members.



Voisin planetary-magnetic relay (Cotal license) as used on a 13 hp. six-cylinder model. The flexible tube shown in sketch is not being used on the latest model + + +

Voisin Magnetically-Controlled Two-Speed Gear

A TWO-SPEED planetary gear for insertion in the propeller shaft of an automobile has been developed by the Voisin Automobile Company of France. This two-speed drive (or "relay," as it is called in France) is used in connection with a regular three-speed transmission and is designed to give the same advantages as the well-known four-speed transmission with silent third speed, with the additional advantage that the change from high to low speed in the two-speed gear is effected by merely pressing an electric button and without releasing the accelerator pedal.

The propeller shaft is cut in two, and on the forward part is mounted an internally toothed ring gear with a magnetic clutch member on the outside. This ring gear meshes with a set of three planetary spur pinions carried on a disk mounted on the driven part of the propeller shaft. The three planetaries in turn mesh with a central sun pinion which is secured to a disk of magnetic material and which is shown divided into sectors in the right-hand portion of the mechanism in the illustration. Back of this "armature," or to the right of it, there is another electro-magnet which is fixed to the stationary housing.

This two-speed gear is controlled by means of a two-point switch. With the switch in one position the electro-magnet on the ring gear is energized; it attracts and holds the "armature" on which the sun pinion is carried, and the entire mechanism is then locked together and the drive is directly through the "relay." For the low speed this electro-magnet is de-energized and the stationary one energized. Then the sun pinion is held stationary and nest of three planetaries rolls upon the sun pinion at a speed somewhat lower than the speed of rotation of the internally-toothed ring gear.

Either the high or the low gear in the two-speed transmission can be used together with any of the three forward speeds in the regular transmission, but only the high gear of the relay is to be used with the reverse gear.

NEW DEVELOPMENTS—AUTOMOTIVE

Mathews Heavy-Duty Roller Conveyor

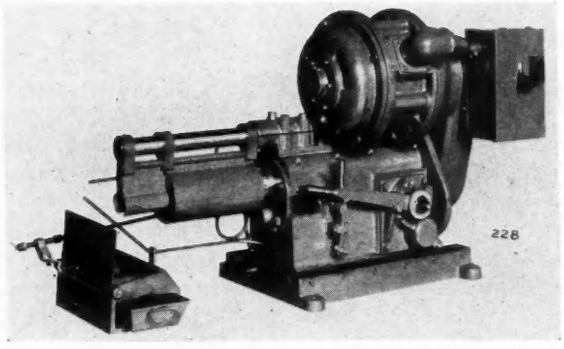
A HEAVY-DUTY roller conveyor, designed for use in foundries or other plants where heavy service is encountered has been announced by the Mathews Conveyor Company of Ellwood City, Pa.

Featured in the new model is a unique "gear-lock" made possible through gear teeth on the cone and knurling on the axle of the conveyor. The lock altogether eliminates the turning of bearing on the axle. Clogging of the conveyer is eliminated by protecting all bearings with a special steel and felt washer labyrinth which is said to effectively exclude all dust, dirt, grit, etc. These bearings can be packed with grease or furnished with lubrication fittings if desired.

Another feature is the "keylock" axle. One end of the axle is provided with an upset key, fitting into a corresponding slot in the frame rail. This prevents the axle from turning. The opposite end of the axle has standard cotter key-lock. Axle can be easily removed from the frame.

Bradford Automatic Drill Head

A SELF-CONTAINED, automatic drill head, developed for use in metallurgical testing laboratories, has been perfected by the Bradford Machine Tool Co., Cincinnati, Ohio. This particular unit was made for the Carnegie Steel Corp. drilling a 1 in. hole 1 in. deep to obtain chips for chemical analysis.



The cycle of this drilling head is as follows: 1. Drill advances in rapid traverse with chip collector cover closed. 2. Drill slows down for feeding stroke and penetrates ½ in. to remove all scale and dirt from test bar. 3. Drill returns in rapid traverse for ⅜ in. and air jet removes all dirt and chips from hole and collector box cover. 4. Drill advances ⅜ in. in rapid traverse, air jet is cut off and collector box cover opens. 5. Drill automatically slows down for feed stroke, penetrating 1 in. deep. 6. Drill returns in rapid traverse to the starting point and collector box cover closes.

The motor unit is rated at 5 hp. and operates at 1800 r.p.m. The complete unit is about 26 in. long overall, 16 in. wide and 30 in. high. New weight 600 lb. approx.

Powell Pure Air Heaters

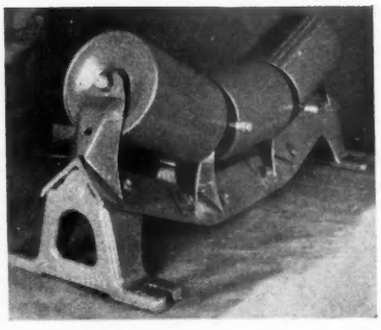
TWO designs of car heater have been developed by the Powell Muffler Co. of Utica, N. Y. One is a blower-type heater, which comprises a heater

jacket surrounding the engine exhaust muffler, a small electric blower blowing air through this jacket, and a small, flat register which does not extend above the floor and through which the heated air enters the interior of the car. The heat flow with this heater is controlled by means of a small electric switch on the steering column.

The other heater referred to is known as a funnel-type and makes use of the air moved by the radiator fan. The funnel used with this heater is so designed as to gather the largest possible amount of air for a given size of opening. The heating unit is identical with that of the blower-type heater. The crown-shaped floor register contains a shutter by means of which the amount of heat can be controlled.

Simplified Belt Conveyor Carrier

A NEW roller bearing belt conveyor carrier, known as the "Pacific Type," has just been developed by the Stephens-Adamson Mfg. Co. of Aurora, Ill. Timken bearings are used throughout and the carrier is featured for use wherever a high grade conveyor of medium price is wanted.



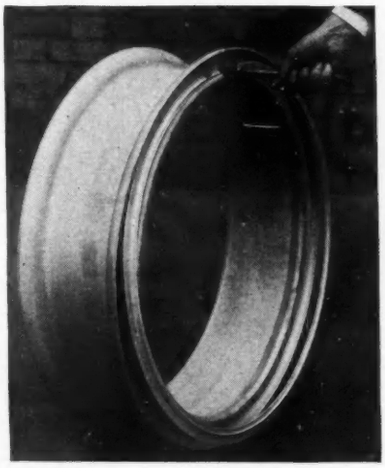
In many respects the "Pacific Type" is similar to the Stephens-Adamson Simplex carrier.

PARTS, ACCESSORIES AND PRODUCTION TOOLS

The "Pacific" carrier is built in sizes for conveyor belts from 18 to 48 in. wide. Clearance dimensions such as backing, bolt spacing and overall are practically the same as other types of carriers of their manufacture.

Firestone Type "R" Rim

THE Firestone Steel Products Co., Akron, Ohio, has recently developed and is now in production on a new type "R" truck rim. Although it has several new features, it is interchangeable on the same wheels with other types of Firestone truck rims, since the standard 28-deg. mounting bevel has not been altered. Claims made for the new rim are that it is simple, safe and durable; it is made in one piece, and the locking ring is easily removed with a tire tool or a screw driver.



The Firestone "R" rim is a continuous-base rim with one side flange integral with the base, and one continuous removable side ring. A new type of locking ring is riveted at one end to the removable side flange. The "R" rim is made in 7, 8, 9 and 10 in. sizes, in 20, 22 and 24 in. diameters, and is recommended for heavy-duty service.

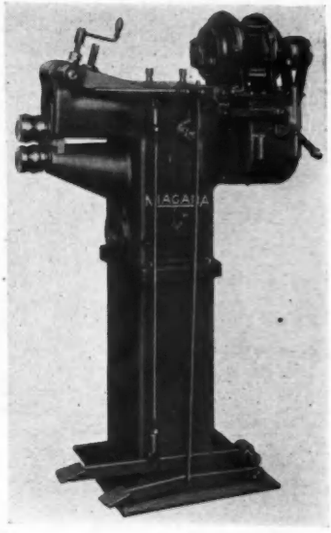
Cuno Electric Windshield Warmer

THE Cuno Engineering Corp., Meriden, Conn., announces the new Cuno "Icy-Free," an electric windshield warmer designed to prevent ice and frost from forming on the windshield in snowy, sleety weather. When not needed as a windshield warmer, it can be readily converted into a cigar lighter by replacing the warmer plug with a cigar lighter unit furnished on the dash attachment, and a small bulb can be inserted in place of the heater unit to transform it into a practical trouble lamp.

A convenient attachment bracket permits easy installation on the dash of all cars except Fords, for which a special clamp for steering post mounting is supplied. Provision is made for quick switching on and off. A special adjustable bracket is supplied so the warmer can be quickly attached to the lower edge of the windshield directly beneath the wiper.

Niagara Power-Driven Combination Machine

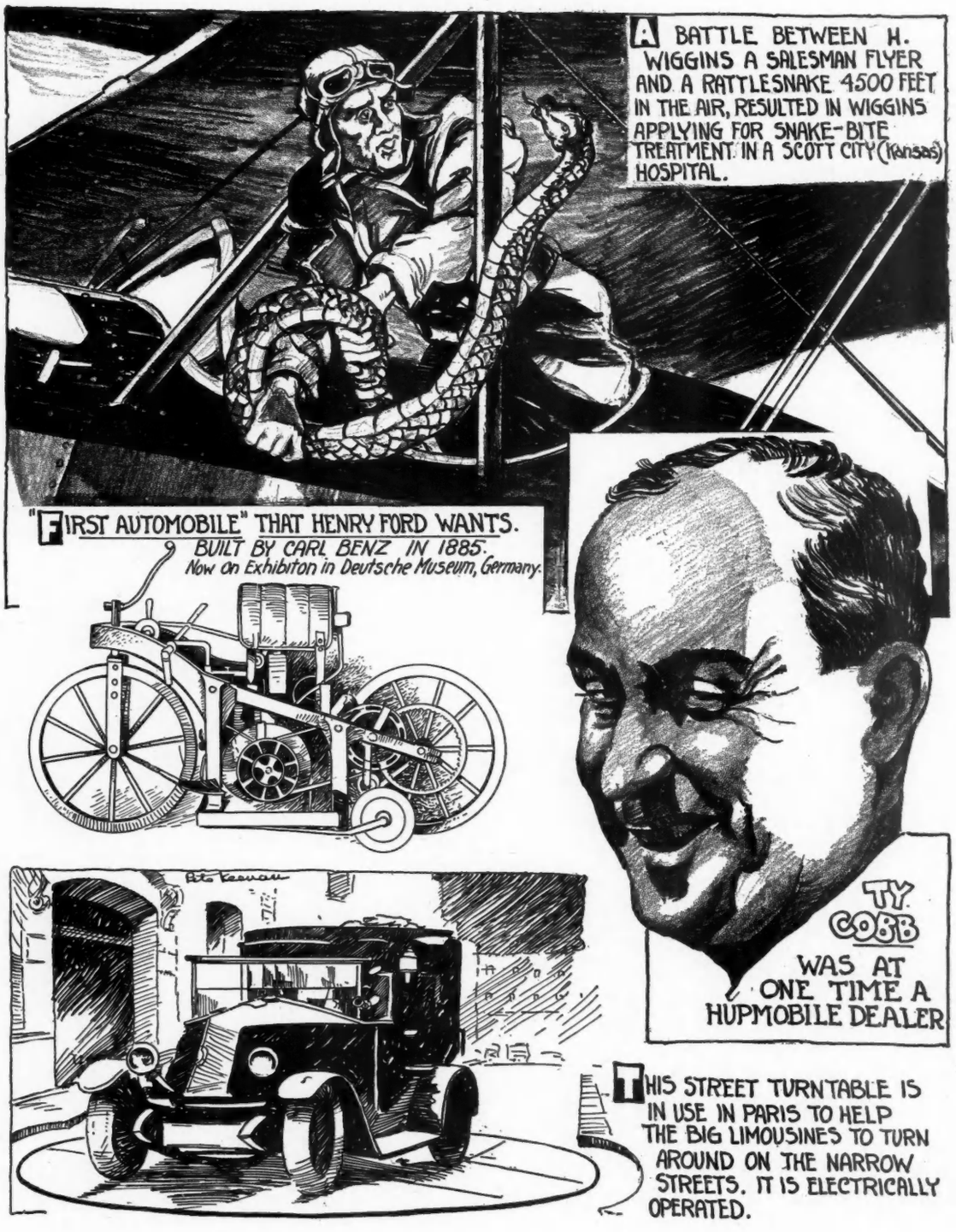
WITH a maximum capacity of No. 14 gage mild steel, the new No. 180 combination machine just placed on the market by The Niagara Machine & Tool Works, Buffalo, N. Y., is designed for universal rotary operations such as turning, wiring, crimping, and beading. It is also suitable for general maintenance requirements. Single pulley drive or belted motor drive through self-adjusting ball bearing idler can be furnished. Motion of the rolls is controlled by a clutch of simple, durable design operated by hand or foot control. It can be locked for continuous operation.



The vertical adjustment of the top roll is accomplished by crank handle and foot treadle, each working independently of the other. Arrangement of the crank handle is such that it clears the work in any position. The clutch treadle is separate from upper shaft treadle, both in correct position for the operator. Rolls are interchangeable. They are keyed to the shaft ends and securely held in place with collar screws flush with the end of the rolls. Gages are also interchangeable.

Provision is made in the frame to receive a special horn and the machine can be operated as a circle shear by mounting the circle arm on the horn and using slitting cutters on the roll shafts. A yoke and pivot arm can also be attached for holding round blanks which are to be flanged.

Automotive Oddities—By Pete Keenan


A BATTLE BETWEEN H. WIGGINS A SALESMAN FLYER AND A RATTLESNAKE 4500 FEET IN THE AIR, RESULTED IN WIGGINS APPLYING FOR SNAKE-BITE TREATMENT IN A SCOTT CITY (Kansas) HOSPITAL.
"FIRST AUTOMOBILE" THAT HENRY FORD WANTS.
BUILT BY CARL BENZ IN 1885.
Now on Exhibiton in Deutsche Museum, Germany.
TY COBB WAS AT ONE TIME A HUPMOBILE DEALER
THIS STREET TURNTABLE IS IN USE IN PARIS TO HELP THE BIG LIMOUSINES TO TURN AROUND ON THE NARROW STREETS. IT IS ELECTRICALLY OPERATED.

NEWS OF THE INDUSTRY

Motor Wheel Reports Profit

Earnings for Third Quarter are Six Cents Per No Par Share

CHICAGO, Nov. 5—Motor Wheel Corp. and subsidiaries report for the quarter ended Sept. 30, net profit was $51,417, after Federal taxes, interest, etc., equal to 6 cents a share on 850,000 no par shares of common stock outstanding. This compares with $386,171, net, or 45 cents a share earned on 850,000 shares in the last preceding quarter and $872,398, net, or $1.27 a share earned on 687,500 shares in the September quarter of 1929. Net profit for the first nine months of 1930 totaled $1,032,024, after the above charges, equal to $1.21 a share on the 850,000 shares, against $3,305,396 net, or 80 cents a share earned on 687,500 shares in the first nine months of 1929.

Developing New Engines

MILWAUKEE, Nov. 6—As part of the 1930 expansion program calling for an expenditure of $675,000, the Waukesha Motor Co., Waukesha, Wis., is developing eight new industrial engines, of which five are now in production. The remaining three are new Diesel designs of 90, 100 and 300 hp., and will be ready about Nov. 15. They are designed for use in oil fields, lumbering and railroad locomotives, and in stationary powerplants, air compressors, excavators, etc.

Increases Capital Stock

MILWAUKEE, Nov. 4—Capital stock of the Milwaukee Parts Corp., 607 South Sixth St., Milwaukee, has been increased from $53,000 to $150,000, following government acceptance of a newly designed aircraft engine which has been in development since the concern began business in 1920, and which will now be placed in production.

Offers Steering Option

LONDON, Oct. 20 *(by mail)*—Rolls-Royce announces today that as a result of demands in various export markets, the 40-50 h.p. Phantom II chassis will in future be available with the steering and other controls on the left-hand side, instead of the right hand as required by British buyers.

The News Trailer

By Herbert Hosking

They're trading cotton at 15 cts. a lb. for cars in Birmingham . . . **Chrysler** dealer in N. J. takes goat in part trade . . . suggested for the industry a commodity exchange of its own * * * **John Scoville, Chrysler's** statistician, got lost in **Philadelphia's** subway(s) last week * * * **Guaranty Trust Co.** thinks depression has hit bottom . . . main thing is how long can it breathe under water? * * * **Russell Mfg. Co.**, Middletown, Conn., is the town fire department, furnishing engines and whistle * * * **Cord** cars have won 39 European prizes in 6 mos. * * * **A. A. Bull**, pres. **Handy Governor**, is in Europe with **T. I. Larson** of the engineering staff * * * the famous **Rickenbacker** smile bloomed this week when E. V. received the Congressional Medal of Honor from **President Hoover** * * * **H. L. Horning, Waukesha's** pres., thinks the nation's speedometer needs recalibration * * * **C. W. Nash** presented **Clayton Rand**, edit. Gulfport (Miss.) **Guide** with a Nashautomobile recently . . . **Rand** won contest glorifying Wisconsin * * * gasoline at present prices is about the cheapest fuel possible of discovery, **Dr. H. C. Dickinson** of the Standards Bureau thinks * * * Alfonso of Spain has a new **Graham** touring job and **Eagle-Ottawa** leathered it * * * **Goodrich** branch managers were in Akron recently to talk 1931 policies * * * **I. J. Reuter** and **W. A. Blees** are bringing **O-P** dealers to the **Oakland** factory in small groups to talk things over * * * **Hupp's** skyparade was the talk of Detro-it last week . . . **Clarence M. Young**, Dept. Com. Aero Sec., congratulated Du Bois Young on the attention it drew to planes * * * **Miss Helen L. E. Doherty** is presenting a dozen of her friends with Ford sport jobs decorated with hand-painted silhouettes . . . **King Alphonso** will get one of these too . . . do your Christmas shopping early.

To Open Elevated Road

NEW YORK, Nov. 6—The first section of the elevated highway along the west side of Manhattan from Canal St. to Twenty-second has been completed, tested and will be officially opened to traffic on Nov. 13.

Auto-Lite Earns $4.51 on Common

Payment of Regular Dividend is Predicted by C. O. Miniger, President

TOLEDO, Nov. 5—Gross earnings of $7,637,803 for the first nine months and a net earning after all charges and taxes, including extraordinary moving expense of $368,000, amounted to $5,456,469 for the Electric Auto-Lite Co., it was reported by C. O. Miniger, president, today.

This is $4.51 a share after preferred dividends and deducting treasury stock and is equal to $5.85 a share on the outstanding stock before taxes and preferred. Earnings of between $1.25 and $1.50 a share for the last quarter are forecast.

President Miniger indicated there would not be much question about the regular $1.50 dividend payable Dec. 31, as after its payment the company would have $2,000,000 cash on hand. He said the company does not anticipate a heavy first quarter in 1931, but that the total next year will be considerably greater than for the current year.

Borg-Warner Reports Profit

NEW YORK, Nov. 5—Borg-Warner Corp. reports net profit for the nine months ended Sept. 30, after all charges, of $2,574,205. This is equivalent after subsidiary preferred and preferred dividends to $1.92 a share on common stock and compares with earnings of $6,401,358, or $5.05 a share, last year. Profit for the three months ended Sept. 30 was $198,834, or ten cents a share, as compared with $1,846,931, or $1.45 a share, last year.

Beasley Succeeds Evans

DETROIT, Nov. 6—P. R. Beasley has succeeded Edward S. Evans as president of the Detroit Aircraft Corp., according to an announcement from the corporation. Mr. Evans has been elected chairman of the executive committee of the board of directors and will continue to take an active part in the affairs of the company.

O'Mara Leaves Brockway

NEW YORK, Nov. 6—Martin A. O'Mara has resigned as president of the Brockway Motor Truck Corp.

Men of the Industry and What They Are Doing

Jackson Elects Carpenter

T. M. Carpenter, general manager of the crankshaft division of General Motors, Saginaw, Mich., has been elected vice-president and general manager of the Jackson Motor Shaft Co., of Jackson, Mich., a recently acquired subsidiary of the Muskegon Motor Specialties Co. He will assume his new duties Nov. 15. H. O. Hess, the factory manager at the Saginaw plant, has also just become affiliated with the Jackson Motor Shaft Co. This was announced today by Fred L. Flanders, chairman of the board of the parent company.

Continental Elects Beall

F. F. Beall has been elected to the board of directors of Continental Motors Corp. He is a former vice-president of the Packard Motor Car Co. and later engaged in the development of a new motor fuel in conjunction with the Pure Oil Co. and the Dawes Brothers of Chicago. This fuel is now being advertised.

Macfee Leaves N.S.P.A.

R. Macfee, secretary of the National Standard Parts Association, Detroit, has resigned, effective Dec. 1, according to an announcement made by E. P. Chalfant, executive vice-president of the N.S.P.A. Appointment of Mr. Macfee's successor in the N.S.P.A. has not yet been made.

Wisconsin Names Ketcham

William J. Ketcham has been appointed chief metallurgist of the Wisconsin Axle Co., a subsidiary of the Timken-Detroit Axle Co. He will be in charge of the company's laboratory at Oskkosh, after having served as assistant to H. W. McQuaid, Timken's chief metallurgist at Detroit.

Milwaukee Section Honors Stout

William B. Stout, Detroit, noted aircraft engineer, was the guest of honor at the monthly dinner meeting of the Milwaukee Section, S.A.E., on Wednesday evening, Nov. 5.

Stickney Joins Judkins

R. L. Stickney, who has been designer and artist for LeBaron, Inc., has associated himself in a similar capacity with the J. B. Judkins Co., Merrimac, Mass.

Oakland Names Two

W. A. Blees, vice-president in charge of sales for the Oakland Motor Car Co., has announced the appointment of W. R. Huber as sales promotion manager. Mr. Huber was formerly zone sales manager for Oakland at Washington. Prior to that time he had spent 13 years in the sales department of the Delco Light Co. at Dayton, Ohio, during the last four years of which he was general sales manager.

H. H. Goodrich, former sales promotion manager, has been placed on special assignment to the home office sales department under Mr. Blees. The new assistant sales promotion manager under Mr. Huber is G. D. Burns, who for 12 years was associated with him at Delco Light, where he held the title of assistant general sales manager before coming to Oakland.

Brockway Appoints Kerr

M. L. Kerr has been appointed chief engineer of the Brockway Motor Truck Corp., and will make his headquarters in Cortland, N. Y., where engineering activities of Brockway and Indiana are being concentrated.

Crude Oil Prices Reduced

CHICAGO, Nov. 6—Long expected reductions in Mid-continent crude oil prices of major purchasers were made last week when Standolind Crude Oil Purchasing Co. (formerly Sinclair Crude Oil Purchasing Co.) posted prices of 65 cents to $1.10 a barrel. This represents cuts of 7 to 38 cents a barrel.

Sterling Exports Improve

MILWAUKEE, Nov. 3—Export sales of the Sterling Motor Truck Co., Milwaukee, so far this year are considerably ahead of the same period of 1929, and domestic business is undergoing stimulation as well, according to Robert G. Hayssen, president.

Stewart-Warner Earns 35 Cents in Quarter

Pays Regular Dividend at 50 Cent Rate

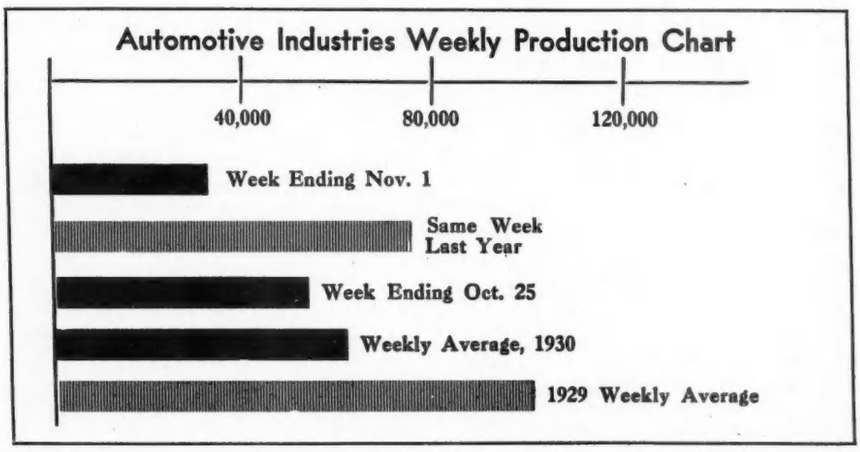
CHICAGO, Nov. 3 — Directors of Stewart-Warner Corp., meeting Saturday, voted payment of a 50 cent dividend for the current quarter, or the same as was declared three months ago. Announcement was made that the consolidated net income for the quarter ended Sept. 30, 1930, was $454,587 after depreciation, taxes and other charges, equal to 35 cents a share on 1,289,590 shares of capital stock.

These earnings compare with a net profit in the preceding quarter of $872,852 after all charges, including the writing down of investments, or equal to 67 cents a share on 1,299,390 shares. In the three months ended Sept. 30, 1929, the net income was $1,897,909, or $1.47 a share.

For the nine months ended September, the consolidated net income after all charges totaled $1,987,450, equal to $1.53 a share on 1,289,590 shares, as against $6,426,281, or $4.99 a share on the same basis in 1929.

Form New Company

MILWAUKEE, Nov. 3 — Interests identified with the Waukesha Motor Co., Waukesha, Wis., have incorporated the Fawick Mfg. Co., with $300,000 capital, to manufacture and market a newly patented clutch and other automotive units designed by Thomas F. Fawick, of Akron, Ohio, who has been elected president of the new concern. S. A. Perkins, secretary of the Waukesha Motor Co., is vice-president, and C. L. Eason of Detroit, secretary-treasurer. Production of the line will be conducted in the Waukesha plant of the Hein-Werner Motor Parts Co., which also is closely allied with the Waukesha Motor Co. The Fawick clutch is of the internal expanding type and is designed principally for application to industrial gasoline engines, in which the Waukesha Motor Co. specializes. All stock of the new company has been fully subscribed, Mr. Perkins said.



Bosch Companies Plan Pooling of Efforts

Directors Approve Merger of German and U. S. Rivals

SPRINGFIELD, MASS., Nov. 4—Further steps toward the merging of the American Bosch Magneto Corp. and the Robert Bosch Magneto Co. in a new concern to be known as the United American Bosch Corp., were taken at a meeting of the American Bosch directors in New York, Nov. 3, when details of the proposed union were ratified. The plan will be submitted to the American Bosch stockholders Nov. 18. It provides, among other things, for an increase of American Bosch common stock, part of which will be issued in exchange for Robert Bosch assets.

The executive organization here will be enlarged and will include several men who are coming from Germany. The new concern will become the exclusive sales outlet in American territory for all products of Robert Bosch A. G., of Stuttgart, and Robert Bosch A. G. in turn will undertake to sell products of the American company through its European sales branches. Research facilities of the Robert Bosch A. G. will be applied for the benefit of both organizations. All litigation between the companies was ended a year ago.

Officers of the United American Bosch Corp. will be: President, Arthur T. Murray; vice-president and treasurer, Morris Metcalf; vice-presidents, Louis Beeh, G. J. Lang, Leon W. Rosenthal, Herman Waker, J. E. Wild; secretary and assistant treasurer, R. W. Washburn. General offices of the corporation will be in Springfield, with branches in New York, Chicago, Detroit and San Francisco.

United Aircraft Reports

NEW YORK, Nov. 3—United Aircraft & Transport Corp. reports net income for the third quarter of $1,149,614 after taxes, depreciation and other charges. This compares with net income of $900,391 in the first quarter and $1,202,140 in the second quarter, making a total of $3,252,145 for the first nine months of 1930.

Yellow Coach Reports Loss

CHICAGO, Nov. 3—Yellow Truck and Coach Mfg. Co., for the third quarter of 1930, reports a consolidated net loss of $384,432 after expenses, depreciation, etc., against a net loss of $6,591 in the same quarter of 1929. The nine months' consolidated net profit was $1,053,431, against $853,068.

Rainbow to Continue

COLUMBUS, OHIO, Nov. 4—Through a reorganization of the Rainbow Tire & Rubber Co., which has general offices at 31 East Town St., Columbus, and a plant at Delaware, Ohio, operations at the plant are assured.

Ford Has New Body Model

DETROIT, Nov. 3—The Ford Motor Co. is shipping to dealers a new body model, a close-coupled, four-passenger Victoria, with unusual body lines. A sloping windshield without sun visor and sloping lower rear body panel characterize the new car, which lists at $625. The equipment of this model is unusually complete.

Louisville Sales Improve

LOUISVILLE, KY., Nov. 3—J. Garland Lea, secretary, Louisville Automobile Dealers Assn., in a bulletin issued Nov. 1, on new car sales in Louisville and Jefferson County for October, showed a little improvement in condition. Sales were 376 cars, as against 534 for October, 1929, but the percentage of decline was but 29.6 per cent, whereas the decline for 10 months was 34.2 per cent.

Illinois Sales Poor

CHICAGO, Nov. 3—Illinois new automobile sales failed to make any improved showing during the month of October, according to the Illinois Chamber of Commerce whose report shows October sales of 7648 new cars as compared with 10,446 sales in September and 14,604 during the same month a year ago.

The ten months total for 1930 of $156,063 cars is nearly 70,000 cars under the 1929 total for the same period of 225,680 sales. October, 1930, sales were among the lowest of the year. Cook county reported 3200 new car sales for the month and downstate Illinois 4448 sales.

Mengel Reports Loss

LOUISVILLE, Nov. 4—The Mengel Co., Louisville, at the close of October, issued a statement showing a net loss of $61,353 for the third quarter of 1930, after deductions of all charges, estimated Federal taxes, etc., but showed a profit of $156,320 for the first nine months of the year, after deduction of all charges, estimates, taxes, etc. Net sales for the quarter were given at $1,611,370 and $7,137,904 for the nine months. For the first nine months of last year sales were (net) $15,717,568. Unfilled orders on Oct. 14 of this year were $1,416,000, as against $1,794,000 on Oct. 14, 1929.

Rheem Plans New Plant

RICHMOND, CALIF., Nov. 1—Rheem Mfg. Co., maker at Emeryville and Richmond, Calif., of steel drums and service station equipment, is to build a $225,000 plant at South Gate, Calif., to be in operation by Feb. 1, 1931.

Gets Gar Wood Account

DETROIT, Nov. 3—Advertisers, Inc., will act as advertising counsel for Gar Wood, Inc., Marysville and Algonac, Mich., according to a recent announcement.

Strip Steel Demand Slightly More Active

Sheet Market Continues Along Unchanged Lines

NEW YORK, Nov. 6—Operating rates in steel finishing mills have been adjusted to the prevailing demand which continues along unchanged lines. The market for hot and cold-rolled strip steel may be called a shade more active than it had been, with the hot-rolled selling at 1.60 cents, Pittsburgh, for the wide and 1.70 cents for the narrow sizes and cold-rolled at 2.35 cents, Pittsburgh or Cleveland. The tone of the market is steady which, in fact, holds good of nearly all descriptions of finished steel. Demand for automotive alloy steels is very light, but prices are well maintained. No changes are noted in the sheet market.

Bolt and nut prices are holding their own in spite of paucity of demand. Non-integrated finishing mills are not contracting for semi-finished material. As their light reserves recede, they are able to replenish their supply on the basis of former prices. Declines in takings of steel by parts makers working on Ford orders are made up for to some extent by increased specifications from Chevrolet parts and body makers. The remainder of automotive demand consists largely of small lot orders.

Pig Iron—Interest in first quarter 1930 contracts is lacking so far. The price situation shows little change, the Valley market continuing to be nominally quoted at $17.00 @ $17.50, while the Michigan price remains at $18.

Aluminum—Routine demand for foundry metal is reported.

Copper—It is estimated that since the price of the red metal receded to 9½ cents, delivered Connecticut and 9⅝ cents delivered Middle West, 80,000 tons have changed hands.

Tin—The metal's statistical position showed no improvement at the turn of the month. At the beginning of the week Straits tin was offered at 25⅞ cents.

Lead—Quiet and steady.

Zinc—Smelters are curtailing their output and prices are a shade higher.

National Reports Improvement

CHICAGO, Nov. 3—Current sales of the National Battery Co. and its subsidiary, the Gould Co., are running 15 per cent ahead of last year and a July loss by the latter unit has been supplanted by profits, it is disclosed in an announcement by President L. J. Shields.

Reo Ships 2365

Reo Motor Car Co. has reported shipment of 2365 passenger cars during October, a gain of 112 per cent over October, 1929, when shipments totaled 1116, and an increase of 237 per cent over September this year, when Reo's passenger car output was 702 units.

Tire Prices Increase

CHICAGO, Nov. 3—Increases of from 2½ to 5 per cent on the prices of all standard makes of tires, effective Nov. 1, were announced here by S. B. Harper, president of the National Tire Dealers' Association.

Gasoline Taxes Reach 3.39 Cent Average

Year's Consumption Estimated at Nearly 15½ Billion Gal.

WASHINGTON, Nov. 3—The 48 states and the District of Columbia collected an average tax of 3.39 cents a gallon on 6,809,863,076 gallons of gasoline during the first six months of 1930, according to reports received and compiled by the Bureau of Public Roads of the U. S. Department of Agriculture. After deducting certain exemptions from the total assessed tax, the net tax on the sales of gasoline amounts to $230,600,455. Under the tax laws, certain special fees, amounting to $381,644, also were collected, making a total of $230,982,099.

Based on the ratio of the number of gallons taxed in the first six months of 1929 to that year's total, and on the figures for the first six months of 1930, the amount of gasoline likely to be taxed for the current year is estimated by the bureau at 15,400,000,000 gallons. Figuring the taxes on the same basis and allowing for changes in tax rate, the total for the calendar year 1930 is estimated at $515,000,000.

Chrysler Holds Sales Schools

PHILADELPHIA, Nov. 4—The Chrysler Sales Corp. is now conducting a series of sectional sales schools, lasting one week each, for distributors' wholesale men. Instruction at these schools is being given by a team of factory executives which includes Messrs. Frazer, Rowland, Cooper, Davies, Farley, Greene, Moock, Schaeffer, Scoville, Snyder and Wagstaff.

These schools have already been conducted in Philadelphia and Boston and will be put on in Atlanta, Nov. 10-15; Dallas, Nov. 17-22; Kansas City, Dec. 1-6; Chicago, Dec. 8-13; Detroit, Dec. 15-20; Los Angeles, Feb. 2-7; Seattle, Feb. 9-14.

Buick Reduces Output

DETROIT, Nov. 3—In order to maintain dealer stocks of new cars at the lowest possible level consistent with the normal sales decline during the winter months, the Buick Motor Co. reduced its October production to a total of 11,171 cars, compared with 13,303 cars in September and 20,596 in October, 1929. The November schedule calls for an output of 7061 cars.

National Standard Earns $2.55

CHICAGO, Nov. 3—Earnings of National Standard Co. for the six months ended Sept. 30 amounted to approximately $383,000 after all charges and Federal taxes, equal to $2.55 a share on the 150,000 shares of common stock outstanding as compared with $445,023, or $2.96 a share in the corresponding period of 1929.

Financial Notes

Mullins Mfg. Co. reports net loss for nine months ended Sept. 30 of $31,240 as against net profit of $474,748, or $3.17 a share, for the corresponding period of last year. Net loss for the September quarter was $25,428, compared with a profit of $133,048, or 81 cents a share, for the corresponding quarter of last year.

American Bosch Magneto Co. reports net loss for the nine months ended Sept. 30 of $57,181. This compares with net profit of $927,537, or $4.47 a share, for the corresponding period of 1929. Loss for the third quarter was $37,215, as compared with profit of $554,175, or $2.67 a share, for the third quarter of last year.

Reo Motor Car Co. reports net loss for nine months ended Sept. 30 of $1,305,885 as compared with net profit of $2,093,655, or $1.04 a share, for the corresponding period of last year. Net loss for the third quarter was $956,488, as compared with a profit of $407,297, or 20 cents a share, for the corresponding period a year ago.

Packard Motor Car Co. has declared a dividend of 15 cents a share, payable Dec. 12 to holders of record Nov. 15. Dividends at the rate of 25 cents were paid in the three preceding quarters this year which, in conjunction with the payment just declared, will total 90 cents a share paid this year.

H. H. Franklin Mfg. Co. has omitted the regular quarterly dividend of $1.75 a share on the preferred stock due at this time.

Mack Trucks, Inc., has paid off all bank loans which were shown on the March 31 balance sheet at $4,000,000 and has purchased approximately $1,500,000 in marketable securities.

National Steel Corp. has declared the regular quarterly dividend of 50 cents per share, payable Dec. 10 to stock of record Nov. 30.

Budd Units Report

PHILADELPHIA, Nov. 4—Net earnings of the Budd Wheel Co., for the third quarter of the current year, after all charges, totaled $298,892.05. After payment of the preferred dividends, there remained earnings of $275,784.55, or 28 cents per share available for the common stock for the third quarter.

The earnings for the first nine months of 1930 were $1,224,024.77. After deducting the preferred dividends, these earnings are equal to $1.17 per share on the common shares outstanding. This is more than sufficient to meet the year's dividend requirements of $1 per share on the common stock.

PHILADELPHIA, Nov. 3—Net earnings of the Edward G. Budd Mfg. Co. of Philadelphia and Detroit for the first nine months of the current year, after making provision for Federal income taxes, totaled $315,750.36.

The company is in strong cash position, having over $2,000,000.00 in the treasury without any bank indebtedness.

Publishes 19th Aero Bulletin

WASHINGTON, Nov. 3—Aeronautics Bulletin No. 19, "Aviation Training," has just been published by the aeronautics branch, Department of Commerce. The bulletin is designed to furnish information about approved types of training to prospective pilots and aircraft workers.

Auburn Reports 97c Share Profit

Balance Sheet Shows Strong Position

CHICAGO, Nov. 3—Report of the Auburn Automobile Co. for the third quarter of its fiscal year which ended Aug. 31 was issued last night, showing net earnings of $178,934, equivalent to 97 cents a share on the capital stock outstanding, as compared to $1,118,713, or $606 a share in the corresponding period of 1929. For the first nine months net amounted to $1,044,943, or $5.66 a share, against $2,958,221, or $16.03 a share a year ago.

Consolidated balance sheet as of Aug. 31 shows current assets of $13,406,357, of which $4,950,780 was in cash, call loans and government securities, and current liabilities of $3,230,337, a ratio of better than four to one. Net quick assets per share as of Aug. 31 were $55.16. Inventories have been substantially reduced since the last reporting period. Other than calling attention to the company's strong financial position, President E. L. Cord made no statement.

Commercial Earns 53 Cents

BALTIMORE, Nov. 3—Consolidated report of Commercial Credit Co. and subsidiaries for the third quarter ended Sept. 30, 1930, showed net operating income, after Federal taxes, of $1,117,927.88, which compares with $1,965,224.96 for 1929. Consolidated net income for the 9 months ended Sept. 30, 1930, was $3,389,598.78, which compared with $4,902,174.70 for 1929. Consolidated net income on average common stock outstanding was 53 cents per share for the third quarter of 1930, as compared with $1.39 for 1929.

Hudson on 5-Day Schedule

DETROIT, Nov. 3—Coincident with the initiation of production this week on new Hudson and Essex models, the Hudson Motor Car Co. announces the adoption of a five-day working week effective immediately.

Hudson officials see many advantages in this policy not only from the viewpoint of manufacturing economies but in furnishing employment to a larger number of men, a matter of major consideration at this time.

D. A. C. Breaks Its Sales Record

DETROIT, Nov. 4—Detroit Aircraft Corp. reports gross sales in October of 19 airplanes having a gross value of $166,110. This is the largest amount of business ever booked by the company in a 30-day period.

Hupp Signs 13 Dealers

DETROIT, Nov. 5—Thirteen new dealers were signed by the Hupp Motor Car Corp. during the month of October, according to a release from the factory today.

Memphis Hardwoods in Better Demand

Some Local Body Plants Have Resumed

MEMPHIS, Nov. 3—The lumber trade is a trifle more active in demand now than it was thirty days ago. Production is at least 50 per cent below normal and not likely to be increased materially until a stronger market. The export inquiry is a trifle better and some foreign buyers have visited the market. Automobile stock shows a very slightly increased movement. Oak, ash and cottonwood show a slightly improved demand and gum holds its own, though not actively. Hickory stock is also more active and dimension stock demand generally considerably improved.

During the last few days the Ford Motor Co. at Memphis put 900 to work after a layoff of about 30 days. The plant is now operating three days a week day run. The Fisher Body Co. at Memphis added 800 men the latter part of October and will add as many more before Dec. 1. Other plants of the company have also made additions. Mill machinery concerns in Memphis report some improvement in trade the last fortnight. A good many mill plants are being rehabilitated and a very few new ones are being built. Mills generally in the valley are not so active as usual at this season of the year though weather conditions have been ideal. A very few are running full time, a large number not running at all and others only spasmodically.

AAA on International Body

PARIS, Oct. 17 (*by mail*)—On a unanimous vote the American Automobile Association was elected to membership in the International Association of Recognized Automobile Clubs, at the annual meeting held in Paris this week, thus taking the place of the Automobile Club of America, the recognized body up to the present. The change will go into effect on Dec. 1.

M. & E. A. Plans Banquet

NEW YORK, Nov. 3—The Motor and Equipment Association will hold its annual banquet in connection with the Cleveland show, Nov. 18, at the Cleveland Public Auditorium.

The program includes an address by Captain Irving O'Hay, adventurer, philosopher and humorist, and music by Allen McQuhae, radio tenor, and the Orpheus Male Choir of 40 voices.

Timken Roller Reports

CANTON, Nov. 3—Net earnings of the Timken Roller Bearing Co. for the quarter ending Sept. 30, after taxes, depreciation and charges had been deducted, were set at $1,167,630.15.

International Tunnel Opened

DETROIT, Nov. 3—The Detroit-Windsor vehicular tunnel, connecting the downtown sections of Detroit and Windsor, Ont., was formally dedicated this morning.

Rover Plans N. Z. Depot

LONDON, Oct. 23 (*by mail*)—Following the decision of the Rover Motor Co., Coventry, to establish a factory depot in New Zealand, the managing director, Colonel Searle, is leaving England for Wellington, N. Z., by the Remuera tomorrow. The depot will be in Wellington and will be in full operation shortly. The Rover export manager has already left England for New Zealand with a stock of cars, and upon arrival will appoint distributors throughout the two islands and organize a chain of service stations.

The Rover Co. now has a program consisting of the following models:

10-25 h.p. four-cylinder, 1185 cc., four-passenger sedans (fabric or metal) £189; 16 h.p. six-cylinder, 2023 cc. five-passenger sedans £298; Light Twenty six-cylinder, 2565 cc., sedans £358, and 20 h.p. Meteor, 2565 cc. five-seven passenger sedans £398. All except the 10-25 h.p. model have four-speed twin-top transmission. Prices given are those applying in England.

Changes Contest Rules

PARIS, Oct. 17 (*by mail*)—International automobile records of more than 24 hr. duration have been made more difficult to establish by reason of changes of rules adopted by the International Sporting Commission under which it is forbidden to replace during a contest the following parts: cylinders, connecting rods, crankshaft, crankcase and basechamber, camshafts, transmission, chassis frame members, front and rear axles and their parts. Mechanical work on the car must be done by the crew, using only the tools and parts carried on the car. By reason of these new rules, the long distance records up to 50,000 kilometers, recently captured from Studebaker by the 12-cylinder Voisin, have become very difficult to beat.

Graham Names Agency

DETROIT, Nov. 3—Robert C. Graham, vice-president of the Graham-Paige Motors Corp., has announced the reappointment of Brooke, Smith & French, Inc., as advertising counsel for that organization beginning Dec. 1, 1930.

Dayton Gets Rights

CHICAGO, Nov. 3—Dayton Rubber Mfg. Co. has completed negotiations with the Roderwald Co., Berlin, Germany, for the right to manufacture a Vee-shaped link-wedge belt in North, South and Central America.

General Motors Earns $2.85 on Common Stock

Net Working Capital of Corporation Increases

NEW YORK, Nov. 3—General Motors Corp. reports net earnings for the nine months ended Sept. 30 of $131,403,125, or $2.85 a share, on common stock after deduction for preferred dividends. This compares with earnings of $222,848,335, or $4.96 a share, for the first nine months of 1929.

Net operating profit for the period was $123,826,052, or $2.68 a share. The remainder of the profit accrued during the second quarter from the sale of a block of common stock to General Motors Management Corp. and is thus non-recurring.

Earnings for the third quarter were $25,470,697, or 53 cents a share, as compared with earnings of $70,988,025, or $1.58 a share, for the corresponding quarter of last year.

In commenting upon these figures, Alfred P. Sloan, Jr., president, of the corporation, points out that the corporation is securing a larger percentage of the total domestic automobile business than in 1929, its portion during August amounting to 36 per cent.

He also points out that the corporation's net profit is not greatly out of line with the volume of production. At the same time, inventories of raw materials and finished products and dealers' stocks of cars and trucks on hand have been markedly reduced, while cash and net working capital have been substantially increased.

Cash and marketable securities as of Sept. 30 amounted to $202,351,530 on December 31, 1929. Net working capital on Sept. 30 was $285,777,740, as compared with $251,287,782 on Dec. 31 last.

Inventories of raw materials and finished products during the first nine months were reduced from $188,472,-999 to $113,530,106 and total stocks of finished cars throughout the world were reduced by 42,851.

Reo Reports Loss

DETROIT, Nov. 3—Reo Motor Car Co. has reported net loss for quarter ended Sept. 30 of $956,488 after depreciation, etc., comparing with net loss of $173,961 in the preceding quarter and net profit of $407,297 in the third quarter of last year. Net loss for the first nine months this year is $1,305,886 after above charges, comparing with net profit of $2,093,655 for the same period last year.

Captain Sullivan Dies

NEW YORK, Nov. 3—Captain Harry E. Sullivan, New York district manager for the Manley Division of the American Chain Co., died in Boston, Oct. 26, following an operation for appendicitis. He was 40 years old and had been active in fraternal circles.

Wholesale Financing of Automobiles in August Decreased Below July Figure, Department of Commerce Report Says

WASHINGTON, Nov. 3—The number of automobiles financed during August, as reported to the Bureau of the Census by 485 automobile-financing organizations, was 246,539, on which $102,910,682 was advanced as compared with 285,234 on which $118,397,163 was advanced in July; 347,556 on which $163,763,129 was advanced in August, 1929, and 249,578 on which $120,555,759 was advanced in August, 1928.

Wholesale financing during August was $45,348,877 as compared with $55,577,837 in July and $69,959,084 in August, 1929.

The following summary is a revision of previous tabulations and includes data furnished by 46 additional companies.

	Wholesale Financing	RETAIL FINANCING											
		TOTAL			NEW CARS			USED CARS			UNCLASSIFIED		
	Volume in Dollars	Number of Cars	Volume and Average		Number of Cars	Volume and Average		Number of Cars	Volume and Average		Number of Cars	Volume and Average	
			Total Amount	Per Car		Total Amount	Per Car		Total Amount	Per Car		Total Amount	Per Car
1928													
January		103,135	$ 51,939,527	$504	49,600	$ 32,306,608	$651	40,622	$ 13,487,252	$332	12,913	$ 6,145,667	$476
February		131,071	64,519,704	492	63,344	40,333,907	637	52,193	16,507,535	316	15,534	7,678,262	494
March		193,590	92,703,528	479	96,093	60,632,409	631	75,719	22,888,437	302	21,778	9,182,682	422
April		232,489	112,587,764	484	116,859	73,968,969	633	87,628	26,664,113	304	27,902	11,954,682	428
May	DATA	269,235	130,898,245	486	136,151	85,820,063	630	104,524	31,319,158	300	28,560	13,759,024	482
June	NOT	254,673	123,101,716	483	124,505	82,589,561	663	103,236	31,234,989	303	26,932	9,277,166	344
July	AVAILABLE	250,458	121,805,877	486	124,518	79,152,218	636	96,486	28,950,405	300	29,454	13,703,254	465
August		249,578	120,555,759	483	123,743	78,107,135	631	97,396	29,604,310	304	28,439	12,844,314	452
Total (8 Months)		1,684,229	$ 818,112,120	$486	834,813	$532,900,870	$638	657,804	$200,656,199	$305	191,512	$ 84,545,051	$441
September		207,377	101,564,455	490	99,875	64,277,343	644	83,675	25,895,990	309	23,827	11,391,122	478
October		213,828	103,275,951	483	100,692	64,544,681	641	89,649	27,649,493	308	23,487	11,081,777	472
November		179,035	86,088,505	481	83,903	52,686,923	628	73,795	23,083,328	313	21,337	10,318,254	484
December		150,572	72,328,433	480	62,560	41,386,847	662	68,691	21,822,415	318	19,321	9,119,171	472
Total (Year)		2,435,041	$1,181,369,464	$485	1,181,843	$755,796,664	$640	973,614	$299,107,425	$307	279,484	$126,455,375	$452
1929													
January	$ 36,899,813	155,475	$ 75,018,211	$483	77,933	$ 48,430,114	$621	68,224	$ 22,549,096	$331	9,318	$ 4,039,001	$433
February	47,962,644	188,672	90,468,079	479	102,918	61,606,570	599	75,979	24,445,129	322	9,775	4,416,380	452
March	61,170,730	302,385	140,973,764	466	165,493	96,357,129	582	120,339	37,576,011	312	16,553	7,040,624	425
April	74,884,909	407,022	170,669,318	419	204,280	115,663,926	566	183,521	46,709,886	255	19,221	8,295,506	432
May	72,291,505	396,922	183,345,725	462	211,601	124,649,301	589	166,396	50,565,278	304	18,925	8,131,146	430
June	62,213,046	382,817	178,696,287	467	203,011	121,444,109	598	162,769	49,873,151	306	17,037	7,379,027	433
July	61,839,467	388,600	180,780,297	465	211,059	124,348,966	589	161,287	49,788,421	309	16,254	6,642,910	409
August	69,959,084	347,565	163,763,129	471	183,591	110,893,680	604	148,439	46,437,285	313	15,535	6,432,164	414
Total (8 Months)	$487,221,198	2,569,458	$1,183,704,810	$461	1,359,886	$803,383,795	$591	1,086,954	$327,944,257	$301	122,618	$ 52,376,758	$427
September	DATA	298,541	138,506,676	464	157,634	93,579,040	594	126,749	39,198,001	309	14,158	5,729,635	405
October	NOT	265,762	125,625,764	473	121,651	79,967,218	657	132,184	40,609,905	307	9,304	4,190,302	450
November	AVAILABLE	208,735	94,066,750	451	95,417	57,756,181	605	103,300	31,986,597	310	10,018	4,323,972	432
December		170,330	79,460,837	467	73,865	47,819,401	647	89,133	28,433,535	319	7,332	3,207,901	438
Total (Year)	$487,221,198	3,512,826	$1,621,364,837	$461	1,808,453	$1,082,505,635	$599	1,538,320	$468,172,295	$309	163,430	$ 69,828,568	$427
1930													
January	$ 52,447,062	164,338	$ 71,903,433	$438	78,220	$ 44,952,528	$575	80,068	$ 24,320,783	$304	6,050	$ 2,630,122	$435
February	61,244,849	197,884	85,006,756	430	95,093	52,743,378	555	94,762	28,907,025	305	8,069	3,356,353	416
March	77,428,540	312,031	122,584,620	393	138,757	77,000,540	555	165,461	42,083,646	254	7,813	3,708,434	475
April	85,304,532	344,314	145,790,976	423	170,633	93,710,275	549	162,833	48,440,779	297	10,848	3,639,922	336
May	83,612,531	345,979	140,170,993	405	169,400	93,901,411	554	166,726	42,377,514	254	9,853	3,892,068	395
June	53,639,210	337,929	137,204,896	406	159,231	90,894,537	571	168,719	42,472,910	252	9,979	3,837,449	385
July	55,577,837	285,234	118,397,163	415	130,332	73,419,024	563	149,080	42,453,892	285	5,822	2,422,505	416
August	45,348,877	246,539	102,910,682	417	111,299	63,324,551	569	129,155	37,207,831	288	6,085	2,378,300	391
Total (8 Months)	$514,603,438	1,929,248	$ 923,969,519	$479	1,052,965	$589,946,244	$560	1,116,804	$308,264,380	$276	64,519	$ 25,865,153	$401

Curtiss Tests XO-1G

NEW YORK, Nov. 3—Curtiss Aeroplane & Motor Co. has completed tests on its latest Curtiss military observation plane, the XO-1G. This plane is powered by a water-cooled Curtiss D-12 engine and during preliminary tests showed a speed of 147 miles per hour.

The landing gear is designed to prevent ground looping, being very short and set further back than the usual practice. The landing gear is streamlined with pants to reduce wind resistance.

The upper wing has a cutout to reduce air draft on the pilot and increase the visibility range for observation, and decrease the aerodynamic interference between the upper wing and the front cockpit windshield.

Sanford Acquires Patent

BOSTON, Nov. 4—Sanford Mills, manufacturer of mohair upholstery for the automotive industries, has announced the acquisition of a patent covering types of automobile upholstery plush in use on present-day automobiles. Acquisition of the patent, U. S. No. 1,778,196, recently issued by the patent office, was announced by Frank B. Hopewell, treasurer of the Sanford Mills.

Reo Cuts Truck Prices

DETROIT, Nov. 4—Important price reductions on Reo trucks and speedwagons have been announced by Reo Motor Car Co. The new prices, ranging from $895 and up, f.o.b. Lansing, are the lowest in Reo history.

At the same time that these reductions have been made, a number of improvements, such as shatterproof glass and windshields, three-point cab suspension, 40 per cent stronger rear axle on 1½ ton which accommodates dual wheels, new 1½ ton four-speed transmission with connection for power takeoff, heavier door handles, hood latches, fenders and running boards, etc., have been made in the trucks.

Motor Stocks Decline

NEW YORK, Nov. 3—Capital securities of seven representative automobile stocks decreased in value $231,594,000, or 11.1 per cent, during October, according to Frazier Jelke & Co., New York bankers.

The value of 100 common stocks chosen from 13 different groups decreased a total of $2,512,114,000, or 9.7 per cent, during the month.

The total market valuation of the seven automobile stocks is placed at $1,840,381,000, which compares with $3,120,000,000 for General Motors alone at the end of August, 1929.

Reliance Earns $2.53 a Share

MASSILLON, OHIO, Nov. 3—The Reliance Manufacturing Company, with factories here, makers of lock washers for the automotive industry, have reported for the nine months ending Sept. 30 net earnings of $202,483 after all charges including depreciation and Federal taxes. This is equivalent to $2.53 a share.

Gasoline Consumption in August Was Less Than for Month of July

NEW YORK, Nov. 3—Gasoline consumption in 46 states during August, 1930, was 1,328,547,000 gal., according to figures compiled by the American Petroleum Institute from reports of wholesalers and dealers in various states under provisions of their gasoline tax laws. This compares with 1,344,247,000 gal. in the same states during July.

For comparison with last year, New York and Illinois are omitted inasmuch as no reports were required in those states previous to this year. Exclusive of these states, consumption during August, 1930, was 1,075,998,000 gal. as compared with 1,108,256,000 gal. in August of last year, a decrease of 2.9 per cent.

Consumption during the first eight months of the current year in the same states was 7,243,586,000 gal. as compared with 6,772,881,000 gal. for the first eight months of last year, representing an increase of 6.9 per cent.

Tabulated figures follow:

GASOLINE CONSUMPTION BY STATES

	Tax Per Gallon Cents	Month of July, 1930 Gallons	8 Months Ending With Aug., 1930 Gallons	Aug., 1929 Gallons	Aug., 1930 Gallons	Aug., 1929 Gallons
Alabama	4	15,218,000	15,717,000	17,634,000	116,528,000	117,842,000
Arizona	4	6,111,000	6,192,000	5,972,000	50,823,000	46,722,000
Arkansas	5	13,886,000	12,552,000	15,012,000	92,851,000	86,188,000
Colorado	4	18,542,000	18,360,000	18,105,000	115,953,000	106,168,000
Connecticut	2	23,604,000	22,875,000	22,108,000	147,808,000	132,191,000
Delaware	3	3,101,000	4,466,000	3,782,000	24,088,000	21,420,000
D. C.	2	7,186,000	7,155,000	6,665,000	51,916,000	47,268,000
Florida	6	16,631,000	16,599,000	16,585,000	154,015,000	152,442,000
Georgia	6	20,035,000	21,114,000	25,705,000	149,148,000	147,684,000
Idaho	5	6,615,000	7,223,000	6,992,000	40,109,000	34,120,000
Indiana	4	46,660,000	43,825,000	46,323,000	303,606,000	287,911,000
Iowa	3	40,127,000	37,614,000	38,724,000	259,781,000	216,678,000
Kansas	3	46,350,000	36,573,000	40,117,000	266,249,000	246,021,000
Kentucky	5	16,625,000	16,588,000	16,856,000	110,633,000	100,838,000
Louisiana	4	15,382,000	15,960,000	17,130,000	120,752,000	114,046,000
Maryland	4	17,075,000	16,986,000	17,414,000	113,746,000	106,442,000
Massachusetts	2	54,806,000	55,199,000	55,652,000	354,146,000	330,362,000
Michigan	3	80,015,000	79,736,000	86,125,000	528,081,000	520,641,000
Minnesota	3	43,234,000	43,158,000	43,676,000	263,848,000	234,721,000
Mississippi	5	(a)12,174,000	(a)12,574,000	14,000,000	(a)93,376,000	93,560,000
Missouri	2	42,704,000	40,087,000	41,372,000	286,680,000	254,245,000
Montana	5	(b)8,257,000	8,436,000	8,059,000	54,523,000	48,593,000
Nebraska	4	24,029,000	21,530,000	23,689,000	152,488,000	156,273,000
Nevada	4	2,104,000	1,976,000	1,909,000	12,328,000	11,411,000
New Hampshire	4	8,153,000	8,843,000	8,325,000	42,900,000	37,835,000
New Jersey	2	56,422,000	55,645,000	54,037,000	360,448,000	332,149,000
New Mexico	5	5,181,000	5,441,000	4,768,000	35,749,000	29,171,000
North Carolina	5	21,329,000	20,469,000	21,611,000	160,975,000	165,423,000
North Dakota	3	13,301,000	17,399,000	19,430,000	83,760,000	87,854,000
Ohio	4	94,767,000	97,693,000	100,974,000	658,262,000	626,488,000
Oklahoma	4	32,072,000	29,446,000	30,889,000	216,206,000	207,103,000
Oregon	4	19,362,000	17,737,000	18,075,000	113,554,000	106,038,000
Rhode Island	2	8,890,000	9,247,000	9,227,000	57,902,000	51,416,000
South Carolina	6	10,361,000	10,976,000	11,595,000	77,821,000	77,356,000
South Dakota	4	14,745,000	15,211,000	16,352,000	93,850,000	83,755,000
Tennessee	5	20,305,000	21,111,000	19,899,000	140,990,000	124,818,000
Texas	4	77,175,000	73,283,000	73,608,000	531,169,000	503,822,000
Utah	3½	6,645,000	5,895,000	6,123,000	41,114,000	37,091,000
Vermont	4	5,736,000	6,355,000	6,547,000	30,009,000	28,335,000
Virginia	5	22,010,000	22,887,000	22,420,000	148,972,000	134,993,000
Washington	3	29,721,000	27,593,000	27,333,000	182,338,000	166,990,000
West Virginia	4	14,733,000	14,585,000	14,254,000	90,112,000	81,324,000
Wisconsin	2	48,167,000	49,359,000	48,190,000	289,310,000	253,588,000
Wyoming	4	4,646,000	4,328,000	4,993,000	24,669,000	23,545,000
Total		1,094,192,000	1,075,998,000	1,108,256,000	7,243,586,000	6,772,881,000
Daily Average		35,297,000	34,710,000	35,750,000	29,809,000	27,872,000
Increase over previous year:						
Amount of Increase		.....	(d)32,258,000	.....	470,705,000	.....
Percentage increase in Daily Average		.....	(d)2.9%	.....	6.9%	.....
Illinois	3	95,694,000	94,920,000	.....	.....	.....
New York	2	154,361,000	157,629,000	.....	.....	.....
		1,344,247,000	1,328,547,000			

(a) Estimated.
(b) Revised.
(d) Denotes decrease.

Completes Chilean Plant

NEW YORK, Oct. 31—Curtiss-Wright Export Corp. has completed erection of its first overseas manufacturing plant at Los Cerrilos Airport, Santiago de Chile, and has started work on production of the first of 40 Curtiss Falcon military observation and attack planes for the Chilean government.

At present the plant consists of three buildings, comprising the main factory, hangar and dope shop. The main factory is constructed of steel, brick and concrete and measures 110 by 200 ft. The hangar, of similar construction, measures 119 by 120 ft. The building housing the dope shop and spray room is somewhat smaller.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

NEW YORK, Nov. 5—During October conditions favored retail sales, and to some extent the jobbing trades, although reports from these lines are none too favorable. General industry during that month was irregular, and on the whole unsatisfactory. The movement of merchandise last week appears to have fallen off in both the jobbing and wholesale lines. With the exception of the cotton goods industry, industrial activity last week was a bit more sluggish.

DEPARTMENT STORE SALES

Department store sales during September, according to the Federal Reserve Board, were 34 per cent above those during the preceding month; sales in wholesale lines were considerably below those a year ago.

UNEMPLOYMENT

Unemployment among trade unionists during October, according to reports from trade unions received by the American Federation of Labor, showed no improvement over conditions during the preceding month.

CAR LOADINGS

Railway freight loadings during the week ended Oct. 18 totaled 931,085 cars, which marks a decrease of 254,479 cars below those in the corresponding period last year and a decrease of 232,050 cars below those in the corresponding period in 1928.

CRUDE OIL OUTPUT

Average daily crude oil production for the week ended Oct. 25 amounted to 2,378,200 bbl., as against 2,370,750 bbl. for the preceding week and 2,869,700 bbl. a year ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended Nov. 1 stood at 82.4, as against 82.7 for both the week and two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended Oct. 29 were 41 per cent below those in the corresponding period last year.

STOCK MARKET

The stock market during the first two days of last week was firm; but weakness developed, and the market suffered a relapse during the remainder of that period. It is reported that among the depressing influences were the reports indicating dividend reductions and the decline in the operations of steel mills from 55 per cent of capacity at the beginning of October to 49 per cent last week. Trading was on a small scale. Net changes for the week showed substantial losses.

May Revive Bennett Race

Old Rules Would Prevail, is Belief

PARIS, Oct. 17 (*by mail*)—The Gordon Bennett cup race, run for the last time in France in 1905, probably will be revived under the old rules of three cars per nation, under a proposal made by Chevalier Florio, chairman of the Italian Racing Board. When this cup was won for the second time by Thery, on a French Brasier car, the Automobile Club of France refused to put it up for competition again, maintaining that they, as the then most important manufacturing nation, were handicapped compared with other nations.

Florio's suggestion is that the cup presented by the late James Gordon Bennett should again be put up for competition in an international race having $40,000 in cash prizes. The French Club is willing to offer the cup and the support of the French manufacturers' association is now being sought.

Plan Long Air Route

LONDON, Oct. 23 (*by mail*)—Details of the agreement between the Air Ministry and Imperial Airways for the Egypt-Capetown air service, linking with the present London-Egypt service, issued today, show that the total subsidies payable for the first five years will be about £940,000. Of this sum, £670,000 is recoverable from governments through whose territories the route will pass, leaving £270,000 as Great Britain's contribution.

It is hoped to open the northern half of the route as far as Mwanza, on Lake Victoria, Nyanza, on Jan. 1, next, and the whole of the route not later than April 1.

Noonan Buys Monighan

CHICAGO, Nov. 3—Noonan - Malstrom Co. has purchased the Monighan Foundry Co., including the goodwill, business and foundry plant at 2135 Carroll Ave.., and a machine shop at 1845 Carroll Ave. The buyer company now occupies the latter property improved with a two and one-half story building and will continue to maintain sales offices there and will also continue to operate the machine shop enterprise as the Monighan Division of the Noonan-Malstrom Co.

Highway Men to Meet

WASHINGTON, D. C., Nov. 8—Highway equipment authorities representing the Federal, state, city and county governments will meet Saturday in Pittsburgh for study of equipment problems at the call of M. De Glopper, materials and equipment engineer, Michigan state highway department, and chairman of the equipment committee of the American Road Builders' Association.

+ + CALENDAR + + OF COMING EVENTS

SHOWS

Charlestown, S. C., Automobile..Nov. 10-15
New York, National Automobile..Jan. 3-10
National Roadbuilders' Show and Convention, St. Louis .....Jan. 10-16
Buffalo, N. Y., Automobile.....Jan. 10-17
Newark, N. J., Automobile.....Jan. 10-17
Milwaukee, Wis., Automobile ..Jan. 10-18
Cincinnati, Automobile .....Jan. 11-17
Baltimore, Automobile .....Jan. 17-24
Boston, Automobile .....Jan. 17-24
Hartford, Conn., Automobile ..Jan. 17-24
Montreal, Automobile .....Jan. 17-24
Detroit, Mich., Automobile.....Jan. 17-24
Louisville, Automobile .....Jan. 19-24
Rochester, Automobile .....Jan. 19-24
Washington, D. C., Automobile..Jan. 24-31
Chicago, National Automobile...Jan. 24-31
Cleveland, Ohio, Automobile....Jan. 24-31
Springfield, Mass., Automobile..Jan. 26-31
Syracuse, N. Y., Automobile....Jan. 26-31
San Francisco, Calif., Automobile, Feb. 1-8
St. Louis, Mo., Automobile.....Feb. 2-7
Camden, N. J., Automobile, Feb. 25-March 2
Denver, Automobile .....Feb. 9-14
Quebec, Automobile .....Feb. 21-28
Des Moines, Automobile .....Feb. 23-28
International Garage Exposition, Berlin, Germany .....May 9-Aug. 9

CONVENTIONS

Society of Industrial Engineers, Washington .....Oct. 15-17
International Acetylene Association, Chicago .....Nov. 12-14
Motor and Equipment Association, Convention, Cleveland .....Nov. 13-19
N. S. P. A. Convention, Cleveland, Ohio, Nov. 13-19
Annual Asphalt Paving Conference, Memphis, Tenn. .....Dec. 1-5
First International Aerial Safety Congress, Paris, France .....Dec. 10-23
Society of Automotive Engineers, Annual Dinner, New York .....Jan. 8
Society of Automotive Engineers, Annual Meeting, Detroit....Jan. 19-23
A. S. M. E. Fuels Meeting, Chicago, Feb. 11-13
Society for Steel Treating (National Western Metal and Machinery Exposition), San Francisco..Feb. 16-20
Road Show and School, Wichita, Feb. 24-27

SALONS

Chicago, Drake Hotel .....Nov. 8-15
Paris, France, Salon (Commercial Vehicles) .....Nov. 13-23
New York, Commodore Hotel, Nov. 30-Dec. 6
Brussels, Belgium, Salon.....Dec. 6-17

Ford Reduces Tractor Prices

DETROIT, Oct. 30—Prices on Fordson tractors in Canada were reduced by $75 to a base of $675, according to announcement from W. R. Campbell, president of Ford Motor Co. of Canada this week. This move brings the prices in line with similar reductions recently made in the United States.

Asks Junking Depots

NEW YORK, Nov. 3—The Automobile Merchants Association of New York, Inc., has addressed a letter to each of the five borough presidents within the city suggesting that they designate two or more points within the borough where cars which owners desire to abandon may be taken and left without charge to the individual.

German Firms Form Truck Unit

New Subsidiary Unites Buessing and N.A.G.

BERLIN, Oct. 18 (*by mail*)—A merger between two old-established firms in the German commercial vehicles industry has just been announced, the firms concerned being Buessing and N.A.G. N.A.G. has been engaged in the manufacture of trucks, buses and sight-seeing coaches, as well as of passenger cars.

Under the new arrangement Buessing (which is a family-owned concern) and N.A.G. (which is controlled by the German General Electric Company) have agreed to take the truck and bus department of the N.A.G. and convey it to a new company which is owned jointly by the two organizing firms, each holding one-half of the stock. The new firm is known as the Buessing-N.A.G. Vereinigte Nutzkraftwagen A.G. and has a capital stock of 4,000,000 marks. The merger becomes effective on Jan. 1. next.

The old Buessing Company as well as the passenger-car department of N.A.G. are not affected by the merger. The newly formed company will produce commercial vehicles at the Leipsic N.A.G. works.

Self-Changing Gears on Tank

LONDON, Oct. 23 (*by mail*)—It is divulged today that among the military vehicles demonstrated three days ago before the delegates of the Imperial Conference was a new 16-ton tank with a 180 h.p. air-cooled Armstrong-Siddeley engine and a four-speed self-changing (planetary) gearset of the same general design as that now standardized for Armstrong-Siddeley and Daimler passenger cars. Two days earlier a Daimler double-deck bus with a fluid flywheel made demonstration trips in London.

Apologies, Mr. Hoffman

In the issue of *Automotive Industries* for Oct. 25, on page 635 of the news section, there appeared a digest of a paper delivered by Paul G. Hoffman, vice-president of the Studebaker Corp., before a convention of the American Management Association in Pittsburgh. In taking exception to the transcript of his speech, Mr. Hoffman, in a letter to this publication, says, in part:

"It is true that I urged the need of more adequate and efficient service facilities, but I tried to make the point clear that in my opinion, service and accessory sales were by-products of new car sales and should be so considered."

Automotive Industries is glad to use this opportunity to correct any existing misconceptions of Mr. Hoffman's point of view on the subject of the relation of new car sales to other activities of the car dealer.